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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

August 1967
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INTERNATIONAL AID IN CONSERVATION

Nigeria Tunisia Algeria Nicaragua Thailand

**A Hundred Watershed Dams
Outdoor Laboratory for Teaching**

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Algerian workmen line up with their tools on the job at the Hausonvillers Dam. Story on page 6.

Horizons . . .

We begin the 33d volume of *Soil Conservation* with an issue that aptly reflects the ever-expanding horizons of the Soil Conservation Service.

Our operations in other lands—intended to help people become self-sufficient through wise use of their land and water resources—are in sharp contrast to our initial mission a generation ago of erosion control on a few demonstration areas in the United States.

The expansion has not been limited to geographic horizons. From a primary preoccupation with soil erosion, our concern has grown to embrace the total complex of soil-related resources—the land as a whole, including water and the plant and animal life that support mankind.

The new logotype on our cover this month is designed to symbolize this shift in emphasis from *soil* alone to total *conservation*.

Vigor: The vigor of a fresh new interest shows in the response of fieldmen to our invitation to report on their foreign assignments.

Armin Grunewald's account (p. 3) of the Northern Nigeria project reveals the effective working arrangement SCS has with agencies of USDA, the State Department, and the government of each participating Nation.

And Elvin Wickline's personal story of his sojourn in Algeria (p. 6) mirrors the personal satisfaction that comes from carrying out a challenging assignment.

soil conservation

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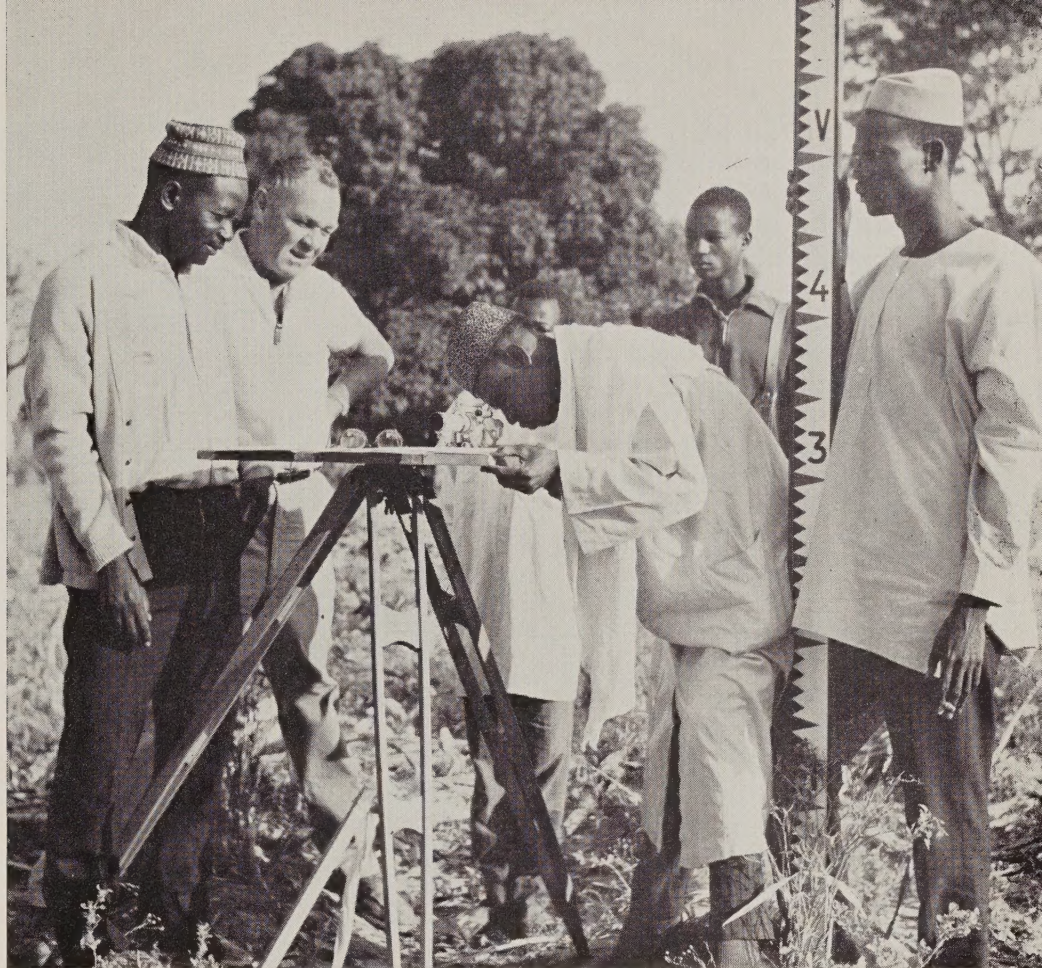
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Mallam Mustapha Kano (left), agricultural superintendent, and Ellis Baker, SCS soil conservation engineer, assist a group of agricultural assistants with a topographic survey at Dankanjiba, Katsina Province.



By Armin R. Grunewald

SCS team leader, Katsina, Northern Nigeria

SCS Conservation Team in Nigeria

The Soil Conservation Service is helping the Nigerian Government with technical supervision of three major conservation endeavors: (1) Training a resident staff of conservationists, (2) developing a technical guide of conservation methods, and (3) planning and applying conservation work in project areas.

In August 1965, a four-man team arrived in Northern Nigeria under terms of an agreement with USDA's International Agricultural Development Service (IADS), the Agency for International Development (AID), and the Nigerian Government. I, as team leader, and E. M. Baker, soil conservation engineer, are posted at Katsina. M. E. Saffry, soil conservationist, and W. L. Shelton, soil scientist, are at Mubi.

There is a desperate need for ex-

pansion of soil and water conservation over wide areas in Northern Nigeria. Excessive and untimely tillage, improper use of implements, removal of crop residues, burning, overgrazing by livestock, and cultivating land not suited to farm crops have contributed to widespread erosion. Soil and water losses are progressively affecting larger areas.

The training program

Training is the fundamental contribution being made in close cooperation with the Ministry of Agriculture staff. An immediate need is to build a specialized staff concerned solely with soil and water conservation activities.

Nigerian counterparts are assisting the SCS team at the training locations. These men are "returned participants" from the USAID

Participant Training Program in the United States, and they have had field experience in soil conservation.

Agricultural assistants and agricultural instructors are in training at Katsina and Mubi. Training has expanded to a third location, Jos in Plateau Province.

The training consists of classroom instruction on basic fundamentals and on-the-job training to apply conservation measures and practices to the farmers' lands. Forty-one agricultural specialists have completed their classroom study and are posted to field project areas in six provinces.

Additional staff will be assigned to the soil conservation training program when they have completed their education at the School of Agriculture or at the Farm Institute Centers. Some agricultural in-

structors will be recruited locally from the secondary schools.

The second objective—development of a technical guide—is progressing satisfactorily. The guide includes standards and specifications for soil conservation practices economically and technically applicable to localized conditions for selected sites in Northern Nigeria. As work experience is gained, the guide will be expanded to cover larger areas.

Technical guide

The technical guide combines knowledge from the fields of engineering, agronomy, and soil science. Research material published by the Institute of Agricultural Research at Samaru has been very helpful. Existing soil survey information is being used with full recognition that the information is incomplete.

The project areas where soil and water conservation work is being done were selected on the basis of need for conservation, the training potential, demonstration value, and the degrees of interest expressed by local farmers. The final selections were made after general reconnaissance and discussion with the farmers, village and district heads, Native Authority staff, and the Ministry of Agriculture.

Project areas and the demonstrations will be used to show alternative methods that can be applied to the land. They will show the beneficial effects that can be expected from sound soil and water conservation. Future work is expected to spread from these nucleus areas.

At the request of the Ministry of Agriculture, the SCS team and the Nigerian soil conservation staff are assisting with planning and giving technical guidance to the resettlement of 50,000 farm people on new farmland in the Kainji Dam watershed. The areas are being selected, as much as possible, on the basis of a semidetailed reconnaissance soil survey. The work is being carried on in cooperation with the Niger Dams Authority Resettlement Scheme.

Work on the land

The Katsina team is concentrating its efforts at Kadandani, Dankanjiba, and Daudawa in Katsina Province. Shelterbelt work to give protection against wind erosion is continuing at three locations in the Northern Sudan vegetative zone.

The work at Kandandani is a continuation of work started earlier. Good conservation was applied, but it was limited in nature and scope. Lack of understanding by

the farmers and lack of a trained conservation staff contributed to maintenance problems. The crews are busy rebuilding contour bunds, improving contour ridging, and renovating watercourses.

New work includes construction of diversion channels above the cultivated land to divert runoff water from bushland. Watercourses are being constructed. Active gully erosion is being arrested by two grade-stabilization structures, a drop spillway, and a chute spillway. Channel improvement and vegetative measures are applied below the structures.

A fadama (bottom land) survey is being made to determine the best method to improve this land for productive farming during both the rainy and dry seasons.

At Dankanjiba severe bank and gully erosion is encroaching into some of the best land in Katsina Province. Drainage channels are needed to control the movement of surface water. The work will include diversions, watercourses, two grade-stabilization structures, small check dams, and sloping of the eroded banks. Seeding and planting permanent vegetation in critical areas is an important part of the program. Permanent protection against human and animal trespassing is necessary.

Milton Saffry, SCS soil conservationist, and agricultural assistants inspect a newly shaped and seeded watercourse at Pankshin.





Agricultural instructor trainees watch Bill Shelton, SCS soil scientist, check soil depth on a proposed demonstration site in Maiha District, Sardauna Province.

The work at Daudawa includes water-control measures to protect cultivated land from encroaching gully erosion. Better farming methods, increased fertilization, conservation crop sequences, and crop residue management are included in the conservation program.

The Mubi team is concentrating its efforts at the Gwoza Resettlement Scheme, at Lamurde and Michika in Sardauna Province, and at two areas in Plateau Province.

The work at Gwoza Resettlement Scheme includes road drainage and stabilization, bank levee and channel improvement on Hambagda River to divert floodwaters, and the revegetation of the catchment area by planting trees.

The work at Lamurde includes terrace systems, watercourses, contour ridging, channel improvement, and a grade stabilization structure. A cooperative drainage channel is being constructed by farmers.

The Michika water-control and fish pond project includes an earth

dam and a 400-foot long spillway. A 40-foot weir, 7-foot drop masonry structure is constructed at the end of the spillway.

At Mayo Bani excavation is complete on 400 feet of a 12,000-foot drainage channel. This channel will improve the drainage for 1,200 acres of productive cropland.

In Plateau Province the team is concentrating on the training program. The group is doing fieldwork at Pankshin and Miango. The work includes watercourse construction and related practices.

The major portion of the work at all projects is done by hand, hoe, and head pan. Small tractors with scraper blades and scoops are used where available.

The SCS team has suggested that farmers share costs in the application of conservation practices on their land. Farm labor is used, and workers are paid 5 shillings a day (70 cents). In two areas, farmers agreed to work for 3 shillings a day, donating the rest of their labor. ♦

Thailand farm is dream come true

A Thai farmer, Nai Sawat Tamata, now has a profitable and productive farm, thanks to technical aid provided by the Soil Conservation Service through an agreement with AID and the Government of Thailand.

It's a pleasant sight and a dream come true for Nai Sawat. The slope of his farm of 45 rai (about 18 acres) in Amphur Chiengkarn District of Changwad Loei Province is broken with contour terraces, and curving rows of healthy cotton plants sweep gracefully out of sight around the bend. Near the foot of the slope, a banana orchard produces fruit and shade and protects the farm buildings. Below, a small stream shimmers in the sun, and Nai Sawat can already see in his mind's eye the off-stream fish pond he plans to build there.

A year ago much of the land was scrub forest and the Tamatas realized only a bare existence from it. Their bananas brought them 900 baht (about 45 dollars) a year. In 1966, the cotton, sesame, peanuts, and vegetables were sold for approximately \$1,050, and the green manure from the crops was extra.

This didn't happen just by chance. Planning and hard work by Nai Sawat, assisted by the Chiengkarn Work Unit of the Department of Land Development, made the improvement possible.

Khun Seri, the work unit leader, and Nai Tamata together prepared the conservation plan. With bulldozers and hand labor, they cleared the land; with tractor and buffalo, they plowed it and built the contour terraces. And now Nai Sawat is laying plans for the fish pond.—CLYDE T. LOWE, *soil conservation adviser, SCS, Thailand.* ♦

Un sejour en Algerie

By Elvin V. Wickline

Project conservationist, SCS, Tizi Ouzou,
Algeria (soil conservationist, Princeton,
W. Va.)



The town of Bou Assem, in the immediate work area of the first project in the Grand Kabylie, was served by a single water fountain.

"..... go to Algeria with a Soil Conservation Service team and help plan and supervise the operation of soil and water conservation projects that will provide employment, apply soil and water conservation practices on eroding land, and in so doing teach Algerian counterpart technicians modern conservation techniques."

This was the essence of an offer and the job description presented to me July 1963 by the Soil Conservation Service. I accepted and was assigned as project conservationist at Tizi Ouzou in the Grand Kabylie of Algeria.

A very busy 3½ months followed, involving language training, security clearances, orientation, passports, physical examinations, immunizations, school arrangements for the children, selling a house, orienting a replacement, storing furniture and personal goods, and packing the rest for shipment. It hardly seems possible that we got it all done, but we did, and on October 28 we boarded a plane at Kennedy International

Airport in New York for the first leg of the journey.

New experiences

Ahead lay a whole new set of experiences. There would be problems, disappointments, inconveniences, frustrations, dangers, and downright hardships. We had promised ourselves all these when we accepted the job. But, there would also be many delightful and rewarding experiences . . . the challenge of a new job . . . a different language . . . a new culture . . . new people . . . and the living in a foreign land.

Now it was all beginning to unfold.

We stopped for 3 days in France to get the children settled into boarding school. Early on the first day of November, my wife and I, both a bit apprehensive at leaving the children in a strange land and a new school, boarded a plane at Orly Airport for the 2½ hours' flight to Algiers.

All but one of the Soil Conservation Service technicians assigned to the Algerian program had

arrived earlier. Charles Hood, program conservationist, and his wife, Pauline, met us at the airport.

Charlie proceeded to perform a near miracle by loading four adults and 11 pieces of luggage in his Volkswagon for the 10-mile ride into Algiers. There we met the other members of the SCS team and their wives . . . people with whom we would associate very closely during our stay in Algeria . . . people whom we would come to know and love very much.

The Grand Kabylie team

The American technical team in the Grand Kabylie was stationed at Tizi Ouzou, a town of about 60,000 people, 60 miles east of Algiers. I was project conservationist, and the other member was Charles L. Walter, conservation engineer, from Montana, who arrived about the first of March 1964. Although he was assigned to the program conservationist's staff, he and his family lived in Tizi Ouzou. Two-thirds of Walter's time was spent with the Tizi Ouzou unit.

Eight very capable young Inter-

national Volunteer Service (IVS) technicians were assigned as junior technicians to supervise the projects. Four of these young men helped begin the work in the Kabylie. They were Shirland Sloane from Illinois; David Strong, Connecticut; Jon Wilda, Pennsylvania; and Warren Palmer, Florida.

About 9 months later as the workload built up, four additional IVS technicians arrived on the project. They were David Barrett, New York; Vernon Carlson, Washington; David Johnson, Illinois; and Larry Clough, Kansas. All the IVS technicians attended SCS training sessions at Fort Robinson, Nebr., before going to Algeria.

Ramdane Zendejebil, of Tizi Ouzou, was employed as an interpreter.

There were two other teams in

Algeria. One was located at Tlemcen near the Moroccan border and headed by Project Conservationist Frank Carr, SCS, of Virginia. The other was stationed at Orleansville, about 120 miles west of Algiers, and was headed by Project Conservationist Tom Dickenson, SCS, Kansas. All three teams were under the supervision of Program Conservationist Charles Hood, SCS, Missouri, who was stationed in Algiers.

"Food for Work"

The "Food for Work" program in Algeria was a technical aid agreement between the Soil Conservation Service, the Agency for International Development, and the Government of Algeria. The aim was threefold: (1) Install soil and water conservation practices on eroding agricultural land,

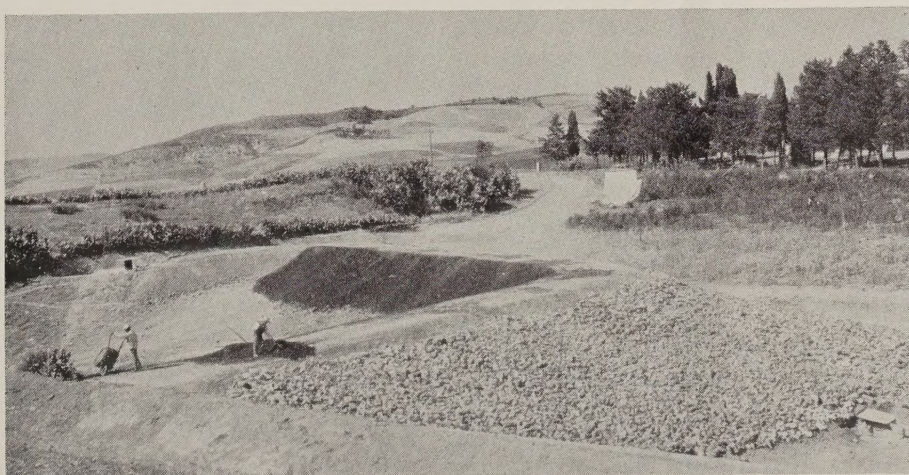
(2) provide employment to Algerians by utilizing hand labor, and (3) teach Algerian counterpart technicians soil and water conservation methods as used in the United States.

The United States furnished technicians to supervise the work and teach the counterpart technicians; it provided the tools, equipment, and vehicles; and it paid about half the daily wage of the workers in the form of wheat and vegetable oil. The Government of Algeria provided management of the labor force and the cash portion of the daily wage, which amounted to about \$1 per worker. Counterpart technicians were never assigned by the Government of Algeria. Work projects were set up near areas of high unemployment so the workers could live at home.

The Grand Kabylie is a densely populated mountainous area in north central Algeria, bordered on the north by the Mediterranean Sea and on the south by the Saharan Atlas Mountains. The climate is typically Mediterranean, with wet winters and hot dry summers. Snow is common in the higher elevations during winter, but in the lower areas the ground never freezes and rarely receives any snow.

Berber customs

A high percentage of the people in the Kabylie are Berbers, who cling to their ancestral customs. Small towns are located on the high mountain peaks and ridges overlooking the surrounding areas as a defensive measure against invading tribes. It is said that a true democracy was practiced in these villages—the winner in an election was declared the mayor



Women wait their turn (above) to carry water from the fountain on the edge of the town of Tazbit. The earth dam at Hausonvillers (below) was built with hand labor. The dark material on the downstream face is refuse from a winery being used as a mulch.

and the losing candidate became the treasurer.

The French occupied Algeria for 138 years and left a strong influence on the culture of the country. French, Arabic, and Kabylie languages are used. Most of the newspapers are in French. Arabic is spoken extensively in the larger urban areas, but in the mountain towns and villages Kabylie, which is an unwritten language, is used extensively. Less than 15 percent of the population can read and write—in any language.

Most of the large farms in the Kabylie, formerly French estates, are now owned by the Algerian Government and are operated by a committee of the workers. The vast number of family farms in the Kabylie are small and are getting smaller as they pass from father to sons.

The principal crops are figs, olives, grapes, oranges, cork, wheat, grain, sorghum, chick peas, melons, and a wide variety of vegetables. Untold thousands of sheep, cattle, goats, and donkeys are raised in the area. The animals are taken out to graze early in the morning and are brought back to the homestead at night.

Although many of the farms, particularly the larger ones, have modern machinery, wooden plows drawn by oxen are common on the small farms. Much of the wheat is threshed by hand, even on the large farms.

Serious erosion

Soil erosion is serious and widespread in the Kabylie on both the large and small farms. By and large, little has been done in the way of effective conservation farming. A few of the French farmers had terraced steep land and practiced "culture en bande" (striperopping). Most of the conservation effort by the Government involved reforestation. A few projects utilizing huge terraces, called "banquettes," had been established on open land.

Nothing has ever been done to improve pasture or range conditions or in any way develop a forage program. Overgrazing is of unbelievable severity. During the extremely dry periods the leafy branches of the fren (ash) tree are fed to the livestock.

West of Constantine and north of the high plains, in the Atlas Tell, is the watershed of Djemila. Here, French archeologists unearthed the Roman city of Cuicul, which had been buried for centuries.

The Romans prospered in the area for some 600 years, but they fled in the 7th century in the face of invading nomads. The land then began to decline under the onslaught of overcropping and overgrazing. Torrential winter rains tore the soil loose from the unprotected hillsides and carried it down the slopes. Slowly but surely Cuicul was buried.

The large Roman city at Timgad, some 70 miles to the southeast, also lay buried for centuries under deposits of wind-blown soil until it was unearthed shortly after 1900.

Today, a large percentage of Algeria is much like the areas surrounding Djemila and Timgad. The hills and mountainsides throughout the country are eroding rapidly, and unless something is done quickly the country's soil resources will be limited to the relatively small acreage of flatland.

The area selected for our first project was some 3 kilometers south of the commune headquarters at Hausonvillers between two smaller towns, Bou Assem and Tazbit. Overcropping and overgrazing had deteriorated the cropland to the point that gullies from 6 to 18 inches deep were frequent. Waterways were raw ugly gulches 10 to 12 feet deep. "Soil conservation" there consisted of cultivating around the ever-enlarging gullies!

Some 4,000 people lived in Bou Assem, Tazbit, and the immediate

work area. Hausonvillers, 3 kilometers to the north, had another 5,000 people. There was little or no employment in the area, and labor was plentiful, even though many of the young men had gone to France to work.

Need for water

All three towns had woefully inadequate water systems. Bou Assem and Tazbit each had a single water fountain supplied by a small open-ended pipe that delivered about 9 gallons a minute during the spring and about half that during the dry season. These two fountains were the domestic water supply for more than 3,000 people!

The village women and children stood in line at the fountain to fill their jugs and buckets. The family clothing was laundered in the nearby stream or at the fountain. There were no provisions for the disposal of human wastes in either town. Both towns had new school houses with modern plumbing installed, but there was little water and less money, and the plumbing was never connected. These problems weren't unique to these towns; everywhere we went we were confronted with almost identical conditions.

In cooperation with Algerian technicians, local citizens, the mayor, and the *sous-prefet*, a conservation plan was developed to do something about the serious soil erosion and water shortages. All the cropland would be terraced and cultivated on the contour. Fruit trees, olives, and figs would be
(Continued on p. 20)

Correction

The last paragraph on page 243 of June *Soil Conservation*, in the article, "World Potentials of Arable Soils," by Charles E. Kellogg, should read: "North America and Central (not South) America together could increase arable soils by about 660 million acres or a bit more."

New grasses tested in Nicaragua to increase feed for livestock

By Gerald M. Darby

Agronomist, SCS, Managua, Nicaragua

In a search for better forage species to increase beef and dairy production in Nicaragua, approximately 75 introduced and locally collected grasses and legumes are being evaluated at the National Research Station near Managua and at field locations.

Assistance in this work, and in general pasture and livestock development, is being provided by the Soil Conservation Service by assignment of a resident agronomist (the author) as a part of a USDA team sponsored and supported by the U.S. Agency for International Development.

Those doing this work have several objectives in mind. One is to find high-producing, easily established grasses that are more palatable than Jaragua (*Hyper-*

rhènia rufa) and Guinea grass (*Panicum maximum*), the grasses now most commonly used in Nicaragua.

The Soil Conservation Service's National Plant Materials Center at Beltsville, Md., provided seed of 38 varieties of legumes and 12 varieties of grasses for the testing being done at the Nicaraguan National Research Center. These species were collected in tropical areas around the world.

Three strains of buffelgrass (*Cenchrus ciliaris*) and one strain of Guinea grass show promise. All four of these grasses are high producers, prolific seeders, have seedling vigor, and are leafy and fine stemmed. The latter two characteristics appear to enhance their palatability.

Buffelgrass and Guinea grass originated in Africa, as did many of the useful tropical pasture grasses. Two of the buffelgrass strains were selected and evaluated at SCS plant materials centers in the United States: one in Florida and one in Texas. Another was selected in Southern Rhodesia. The Florida strain has shown slightly more overall adaptability in Nicaragua than have the other two.

A strain of Guinea grass was selected in El Salvador. It still remains to be seen if all these grasses will survive the 6 months' period from December 1 to June 1 when there is no rain.

For wet soils

Another objective of the plant material search is to find grasses that will do well on a poorly drained, heavy clay soil which covers extensive areas in Nicaragua. Much of this soil is saturated with water for long periods during the rainy season but is dry and cracked during the rest of the year.

German grass (*Echinochloa polystachya*) does well on inundated soils, but its survival during the 6 months of drought has not yet been tested. Two other grasses that show promise are Pretoria 90 (*Dicanthium annulatum*) and Gordo bluestem (*Dicanthium aristatum*). The former is an excellent producer but is a poor seeder. Gordo bluestem is only moderately productive but is a very prolific seeder. How well these grasses survive during the dry season remains to be seen.

Another important need is to find perennial legumes that are compatible with the pasture grasses. Tropical kudzu (*Pueraria phaseoloides*) looks promising. There are, however, good mixtures of native legumes and Jaragua grass in well-managed Nicaraguan pastures. Collection and propagation of native species of *Desmodium*, *Centrosema*, *Calapogonium*, and *Clitoria* seem to offer the most promise. ♦

A group of technicians and administrators review results of grass and legume trials at the National Research Center, Managua, Nicaragua. U. S. personnel are Carl Koone (second from left), rural development chief, USAID; Dr. J. L. Paschal (fourth from left), PASA team leader; and the author (sixth from left).



Training for Visitors From Other Countries

By J. B. Rogers

Foreign training officer, SCS

The Soil Conservation Service has for many years been sharing its technical information and knowledge on soil and water conservation with visitors from other countries. Emphasis has been given to helping technicians from the developing countries, but many from the so-called developed or advanced countries have also sought our advice and assistance.

During the last 10 years, SCS has assisted 3,526 visitors from 98 countries. They spent 52,272 man-days with SCS employees, spending anywhere from 1 day to several weeks primarily at field offices where techniques and procedures were observed and practiced.

Most of the trainees coming to SCS are sponsored by the Agency for International Development (AID). Responsibility for coordinating training assignments among USDA agencies, for preparing programs, and for looking after the needs of the participants rests with the International Agricultural Development Service (IADS). SCS cooperates with IADS by assisting with program planning and by accepting responsibility for training in various aspects of soil and water conservation.

The expenses of AID-sponsored participants in this country are paid by the U. S. Government as a part of our foreign aid program. SCS is also reimbursed by AID for actual expense involved in training their participants.

While AID is the principal source of participants assigned to SCS, many come on their own or on behalf of their government, as fellows supported by FAO or other United Nations organizations, or by private foundations.

During 1966, AID sponsored 359 participants, FAO 20, private foundations and organizations 6, and home governments or self 83, making a total of 468 in all.

Trainees assigned to SCS are of four groups: students, experienced technicians, farmers, and administrators.

Many young people are brought to this country for both undergraduate and graduate work in soil and water conservation and such subjects as soils, range management, irrigation engineering, and watershed management. SCS assists the IADS program specialists with the selection of appropriate universities and usually provides opportunities for practical experience in the field during the summer vacation or after completion of the academic training.

Experienced technicians are people who have been working on the job in their home country. They come to this country to see and to learn new skills and often to update their academic training with or without obtaining a degree. SCS shows them how to work directly with individual farmers and local groups and has them work with experienced personnel to acquire skills in planning, designing, and establishing soil and water conservation practices.

Many farmers come to this country, both by themselves and in groups. For example, during the past 2 years 10 groups of landowners and farmers have come to this country from Argentina to observe our techniques and procedures in all areas of agriculture. All 10 groups expressed a real interest in conservation work. The programs were not just explained

to them but also demonstrated by visits to farms and ranches. These farmers are influential men and women in their own countries and can do a lot to initiate and support programs of their own.

Each year a few high level administrators visit SCS to study the way our work is organized, planned, and administered. They usually spend time in our Washington, State, area, and work unit offices to observe the functions and operation at each level. This, too, is an important part of the foreign training program, since line and staff people have a difficult time adapting and using the principles they have learned if they do not have support from the top administrators of their organization.

The kinds of training provided vary with the needs of the participants.

Academic training at a university (basic or refresher) is often needed so the participant can grasp the scientific principles and understand the technical language used by our professional employees.

Practical field training is provided for those who will return to specialist type positions where they are "doing a job." They learn to do the work by actually practicing the techniques and procedures.

Special short courses have been designed for foreign visitors at our San Luis Obispo training center. They cover all aspects of soil and water conservation, including farm, ranch, and watershed planning, and elements of communication and management. Where possible this work is included at the start of participant programs to lay the groundwork for later field experience.



Five foreign trainees from Ghana, Africa (left), examine root system of sand bluestem plant on a farm in Gill, Colo., with the help of SCS Conservationists Willard Graves and Tom Famon. Trainees from Africa (right) with SCS Soil Scientist Kenneth Good extract soil profile on a farm in Otoe County, Nebr.



Short courses have also been given in soil conservation by Oklahoma State University and by the Soil Conservation Service in Puerto Rico, in irrigation principles and practices by Utah State University, and in range management by Colorado State University.

Observational training is provided for those individuals who have limited time available. They are usually farmers, administrators, or scientists, who have specific objectives and want to get the broad picture or see specific practices.

Most foreign training programs include a mixture of the above kinds of training. They may also involve assignments with other agencies and with universities as well as with the Soil Conservation Service.

In addition to learning technical skills, participants also see how things are accomplished through local leaders and organizations, such as soil conservation districts, and how local, State, and Federal agencies work together.

In the training process, they get to know Americans. American

customs, and American traditions by visiting American families, churches, service clubs, farm organizations, and others

Training results can be evaluated in several ways. The reaction of the participant himself, either formal or informal, is the most common.

IADS conducts terminal interviews with participants. These interviews are aimed at determining the general reaction of participants to their programs and have resulted in many improvements in the techniques used to plan for and work with them.

Each program now carries suggestions for followup with the participant immediately after returning home, 3 months after return, and 1 year after return. The local sponsoring agency representative keeps in touch with the participants regarding their work, the opportunity they have had to use their training, and their significant accomplishments. AID conducts evaluations both in this country and in the home country.

The final proof of the value of training is in accomplishments in

the home country following the training. Many countries have established their own conservation programs. India and Turkey are good examples. Returned participants, AID consultants, and SCS technicians, including the administrator of SCS, have all worked together to get conservation moving in these two countries.

Other countries with active soil and water conservation programs established with advice and help from this country are: Taiwan, Korea, Pakistan, Venezuela, Columbia, Brazil, South Africa, Rhodesia, Kenya, Nigeria, Tunisia, Thailand, New Zealand, and Israel. Many others are starting programs in local areas or incorporating some aspects of soil and water conservation in other programs.

The SCS anticipates a continuing need for training technicians from developing countries. We recognize that foreign training responsibilities are an important part of our job. SCS has a real opportunity to demonstrate the planning, organizing, assigning of responsibility, and scheduling it takes to get things done. ♦

A hundred dams in one watershed . . .

Unruly Chambers Creek Is Being Subdued

The 100th flood-prevention dam in a single upstream Texas watershed project is now being built.

The record-setting dam is in Chambers Creek in central Texas, where flooding has been prevalent as long as old timers can remember.

But you don't install 100 dams on a 77-mile long creek overnight. In fact, it has taken Chambers Creek sponsors 12 years, and the job is just two-thirds complete. But the creek is losing its punch—the 1966 rains proved that.

A weeklong rain of 8 to 10 inches swamped Chambers Creek, a tributary of the Trinity River, in early May last year. Flooding was severe in unprotected parts of the watershed, but the creek stayed in its channel where the dams were built.

"The dam above us saved the day," James Henderson says of his farm on Onion Creek where most of the dams are built. "The water stayed in the creek. We didn't lose a fence, and our creek bottom field didn't flood. One year, before the dam was built, I lost seven bales of cotton from that same kind of rain."

"Our creek ran about three-fourths full," Clyde Garner says of Mill Creek. "If it hadn't been for those flood-prevention dams, the entire bottom would have been flooded."

H. A. Martin's 225-acre farm is just over the hill from Onion and Mill creeks on a section of Chambers Creek where few of the needed dams were in place in 1966. He told a different story.

Martin said the flood cost him about \$7,000. He lost 11 cows, his crops, and his fences.

SCS engineers estimate the project saved \$233,000 in that one rain but would have save \$490,000



Below a series of floodwater-retarding structures, a controlled stream of water (above) flows calmly within the banks of a tributary of Chambers Creek after a 10-inch rain. Before the watershed project was started, floods were so frequent that the highway department had special signs made to warn motorists (upper right). The tops of the posts (middle right) mark the edge of the highway bridge on Chambers Creek before the dams were built. Shading on the map shows areas above the dams and flood plains protected by them.



if the project had been completed.

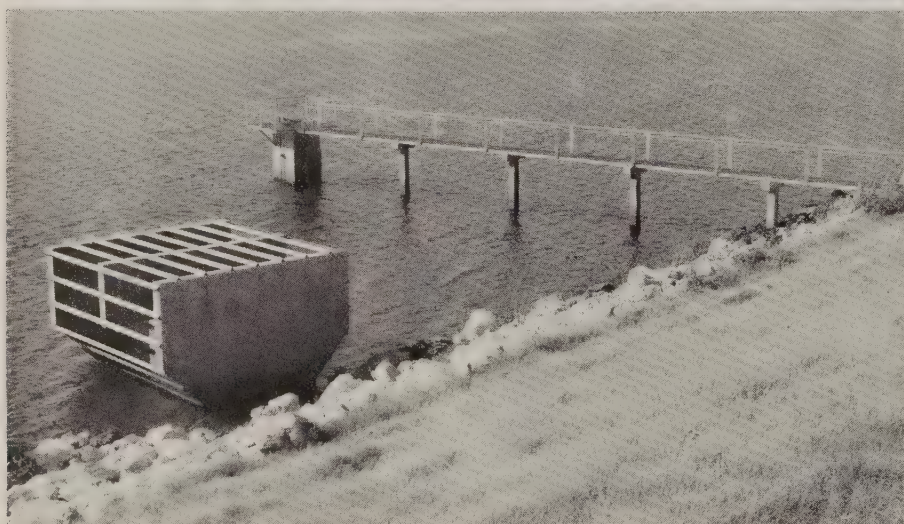
The 100th dam on Chambers Creek is a tribute to the project's frontline, local-level leadership. Four soil and water conservation districts, four county commissioners' courts, and one city sponsor the project.

In the early 1950's, these local interests asked the Soil Conservation Service to help them plan and install a system of land-treatment and flood-prevention measures that would tame the unruly creek.

By 1955, the SCS and the sponsors had hammered out a plan for the 686,000-acre watershed. In addition to terracing, grassed waterways, soil-building crops, and other conservation work, the plan called for 150 flood-prevention dams and 79 miles of channel improvement.

The city of Alvarado has helped in the project because its citizens wanted provisions for water supply built into a flood-prevention dam. The 500-acre lake is now furnishing badly needed water and recreation for the city.

The 100th dam is in the Ellis-Prairie Soil and Water Conservation District on land owned by Mrs. Alta Edmondson and W. D. Campbell. It is in the same conservation district where the first dam was built in 1955. And the Ellis County Commissioner's Court



The city of Alvarado built a boat ramp (upper) on one of the multiple-purpose structures which also includes storage for 4,000 acre-feet of municipal water supply. The control valves are seen back of the spillway inlet in the lower picture.

was the first to pledge all-out help to the districts in getting the project started.

"We are pleased with the overall progress in Chambers Creek," says Weldon Blair, chairman of the Ellis-Prairie District board of supervisors. "Our success so far has been the result of help from the people; however, we'll need more help before it's completed."

"The Ellis County Commissioners' Court knows we have a real good thing in the flood-prevention program on Chambers Creek," adds County Judge Milton Hartsfield. "Public money spent on that project is a sound investment."

Reaching the 100 mark has not been easy. Local sponsors do not acquire 742 easements, permits, and rights-of-way without hard work. But they think it's worth it. . . . that's why they are working so hard to build the remaining 50 dams in the project. ♦

Vegetation

Use and proper management of vegetation is basic to sustained profitable use of the 448 million acres of rotation crops, pastures, orchards, and vineyards and the 485 million acres in permanent pasture and range in the United States. ♦

Terraces assure Tunisian crop

Level terraces in the Oued M'Silah subwatershed in central Tunisia had filled to capacity twice in 3 weeks without spilling a drop. The sandy soil had drunk in the welcome moisture within 48 hours after each storm.

This was a miracle in the 13-inch rainfall area of Tunisia. It had come about as a result of the soil conservation project in the Oued Marguellil watershed being carried on by the Soil Conservation Service under a contract with the Agency for International Development and the Government of Tunisia. Before this, the pelting rains on the soil always caused high runoffs.

The terraces were constructed by Tunisian laborers under SCS supervision and were designed to retain runoff from 10-year frequency storms. The total retention of 3 inches of rainfall from one storm in late September 1966 and nearly 2 inches in early October amounted to nearly two-fifths of the annual precipitation. Since then only a few showers have fallen.

Water collected by the terraces has meant the difference between some wheat and total crop failure for the farmers. A 10 to 20 percent crop is assured on the terraced land. Plants between the terraces and on unterraced land have died from thirst.

The terraces are on 900 acres of the 4,270-acre Oued M'Silah subwatershed of the Oued Marguellil Watershed Project.

As many as 600 laborers were employed at one time, receiving a daily wage equivalent to \$0.55 in cash and \$0.15 in semolina, a wheat product.—LOUIS A. PARTON, *soil conservationist*, and Henry Gembala, *engineer, SCS, Tunisia*. ♦

"I don't think that I could ever teach biology again without an outdoor laboratory."

Robert C. Mills was speaking. He is a biology instructor at the Putney School, Putney, Vt. He has a big outdoor laboratory now—1,000 acres—and it's all part of the grounds of the private school founded in 1935 by Mrs. Carmelita Hinton.

"When I was a biology student in high school," Mills continued, "we studied only bottled specimens. I never knew they actually ever lived anywhere."

"The outdoor laboratory kind of introduction to biology gives students a much broader background than the more traditional indoor, preserved specimen, text-oriented type of course. While a dead specimen in a classroom has its uses, we do not believe that this is the place to begin.

"Biology is the study of life. Ultimately this means the whole organism in its environment. Only for special reasons of convenience and detailed study should it be otherwise. Field study has an integrity that fosters an attitude that we believe important and basic to the study of biology."

Henry Benson Rockwell, director of the Putney School, and Tyree Minton, a biology instructor, share Mills' enthusiasm over the outdoor lab.

"Establishing an outdoor laboratory is one of the best things I've ever done for this school," Rockwell said.

According to plan

When it was decided to create an outdoor laboratory in 1955, the school became a cooperator with the Windham County Soil and Water Conservation District. As a district cooperator, the school received the help of the Soil Conservation Service in drawing up a conservation plan that would make the outdoor lab most useful and effective.

The aim of Mills and Minton is

Outdoor laboratory adds real life to study of biological science

to keep the outdoor lab in a natural state so far as practical. Man's manipulation has been confined to building a few simple dams and bridges across brooks and slashing out trails through brush and woodland.

In the woodlands the biology students learn many things by observation. For example, they acquire knowledge about the growth, survival, form, and age of the trees. As part of their study, they learn that the growth rate of each tree species is related to climate, rainfall, and soil type.

"They learn that certain soils are best for certain species of trees," Mills explained.

The students study the relation of the woods to wildlife. They learn how woodlands provide food and shelter for animals. They even help nature provide for wildlife by piling up tree trimmings to make shelters. They observe that deer sometimes damage trees by chewing off the bark. The effects of woodchucks and mice are also noted.

From a pond the students collect live specimens for study. Included are water boatmen, daphnia,

A jar of algae collected from the pond holds the attention of Biology Instructor Robert C. Mills and Students Carol Quiglass (left) and Cathy Stasik.





Students file along the trail to the pond in Putney School's outdoor laboratory.

cyclops, whirlygigs or water beetles, diving beetles, algae, and several forms of microscopic life.

"We used to buy our specimens, but now we get most of them on the premises," Ty Minton said.

At regular intervals the students check the temperature, oxygen content, pH, and bacterial count of the pond water.

One part of the outdoor lab that the students find especially fascinating is a swamp.

"They discover that the swamp is a whole interesting world in itself," Mills said. "In the swamp they learn about changes in habitat. They identify and study the wildlife—all the organisms that live in the swamp. Birds, beetles, various plants, frogs, mosquitoes, and muskrats—all these come under the scrutiny of and microscopic examination by the students.

"A swamp in natural succession becomes a woodland, and the students really get wrapped up in their search for evidence of change."

Other changes in the ecology of the 1,000 acres form an interesting and continuing study. For example, the students are watching and

recording the sequence from plowed land to climax forest.

An abandoned pasture yields a similar study as the students observe the change from successional to climax vegetation under favorable conditions. Vegetation in the old pasture now includes juniper, steeplebush, meadowsweet, and goldenrod.

Wildlife that the one-time pasture offers for study includes deer mice, moles, voles, jumping mice, and shrews.

A natural stand of hemlock, forming a sort of island in the 1,000-acre laboratory, provides another intriguing area for study. Because of the dense canopy of branches, it is an ideal place to see the effects of shade on undergrowth and wildlife. One of the few kinds of wildlife they find in the stand is the red squirrel.

In all their outdoor studies the students relate soil types to the vegetation and wildlife.

"From data supplied by the Soil Conservation Service we are increasing the understanding of our soils," Mills said. "When the outdoor lab was first authorized, a soil scientist from SCS classified

all our fields on the basis of soil types. That has been a great help. Other SCS technicians surveyed our needs and helped us to develop an overall conservation plan for the laboratory."

Biology is not a required course at the Putney School, but most of the students take it before graduating. ♦

"Soil and America's future" SCSA topic

"Soil and America's Future" will be the theme of the 22d annual meeting of the Soil Conservation Society of America to be held in Des Moines, Iowa, August 13 to 16.

More than 1,000 professional conservationists from the United States and Canada are expected to attend.

The general session will focus on world population problems and environmental factors that influence food production. Use of soil and water resources by the public and the role of soil resources in the United States in meeting domestic and world needs will also be considered. ♦

A crew of 15 soil scientists working in a 7-county area in southeastern Wisconsin mapped more than a million acres in less than 4 years to provide information for the Southeastern Wisconsin Regional Planning Commission and citizens of the area.

With fieldwork completed in the fall of 1965, an interim report, "Soils in Southeastern Wisconsin," was prepared for the planning commission to serve until five standard soil survey publications for the area could be completed by the Soil Conservation Service.

Information available at once

While the survey was in progress, the planning commission received halftone negatives of each field sheet as it was completed. These were reproduced and made available, along with interpretive tables, to people needing information about the soils of specific areas.

The interim report contains descriptions of all the soils mapped, totaling more than a hundred series involving about 1,500 field mapping units. In addition there are some 100 different kinds of interpretation of the meaning of the soil facts in terms of suitability for various uses.

For each mapping unit, inter-

Soil survey for planning body guides zoning and building

By Harry M. Major and Robert E. Fox

Assistant State conservationist and assistant State soil scientist, SCS, Madison, Wis.

pretations were made for 6 specific engineering uses; 7 items pertaining to road construction; 12 items concerning water management; and 8 kinds of farm and nonfarm uses.

Agricultural interpretations tell the suitability and limitations of the soils for cultivated crops and woodland, their needs for irrigation and drainage, and their potential yields of crops and woodland products. The report also includes guides to the use of plant materials for beautification and soil stabilization, and the use of soils for recreational development for wildlife.

A soil limitations rating of "slight," "moderate," "severe," or "very severe" was assigned to each mapping unit, item by item, and the principal factors affecting the rating were listed.

Throughout the progress of the survey, the planning commission was putting soils information on

IBM cards for future reference. It was making soil maps directly from the field sheets for various soil uses, such as transportation systems, residential development with and without public sewage disposal systems, industrial development, and park and open space areas.

The planning commission is promoting the use of soil surveys as a basis for zoning laws and as a basis for detailed planning by cities, towns, and individuals. It contributed \$130,000 toward the cost of the survey.

A demonstration farm

The University of Wisconsin Extension Service is using the County Farm in Waukesha County to demonstrate the relationship between soil properties and soil interpretations. Pits have been dug in the principal soils of the farm and interpretive maps drawn for several uses. An interested po-

An SCS soil scientist, Augustine Otter, takes a slope reading as part of the soil survey in a suburban area.



tential user of soil surveys can learn from these demonstrations the value of knowing the different kinds of soils and their limitations for various uses.

The benefits already derived from the southeastern Wisconsin soil survey have far surpassed the most optimistic early estimates. In the period April 1964 to January 30, 1966, the regional planning commission serviced 298 requests for soil survey information. Clients included private citizens; city, town, village, county, and State governments; consultants, realtors, engineers, builders, surveyors, and planning commissions.

In Washington County a proposed residential development was rejected by the board of health because soil limitations were "severe" and "very severe" for on-site sewage disposal systems. Failure to refer to soil surveys resulted in a loss to developers for construction of the streets, but later use of soils information saved potential home purchasers \$1,440,000.

In Kenosha County, a motel builder turned to soil surveys for aid in selection of a suitable site for a \$1 million investment. The town of Bristol, in the same county, based its entire comprehensive plan on the soil survey.

Some estimated savings

William J. Kockelman, chief community assistance planner of the regional planning commission, compiled the following list of savings resulting from uses of soil surveys:

	<i>Savings Dollars</i>
Three townships, zoning	22,000
Three townships, comprehensive plan	30,000
The town of West Bend, building regulations	5,000
The city of Franklin, subdivision regulations	10,000
The city of Milwaukee, location of one industrial plant site...	5,000
The village of Pewaukee, parks and open space planning	2,000
Total	74,000

Kurt W. Bauer, executive director of the Southeastern Wisconsin

Regional Planning Commission, has estimated projected benefits in the next 20 years of \$300 million on housing alone in the southeastern Wisconsin region. He estimates that without adequate soils information 150,000 homes in the region would be built on unsuitable soils. The excess cost to the public for disposal fields and sewerlines on the unsuitable sites is estimated at \$2,000 a home.

"We have just begun to realize the value of using the soil survey for comprehensive planning," Mr. Bauer says. "The figures that we have provided are only the beginning of the savings that can be made through the use of this information for the location of housing, highways, disposal plants, recreational developments, and other types of development that the public will need." ♦

Most Western streams have near-normal flow

Water supplies are adequate for irrigation and power along most Western mountain streams this season, according to a report prepared by the Snow Survey and Water Supply Forecasting Unit of the Soil Conservation Service at Portland, Oreg.

Less than average flows were expected only in the southern Rocky Mountains and adjacent areas of southern Utah and Arizona. Water shortages are most severe on the Arkansas and Rio Grande.

A cool April that increased the already heavy snowpack and delayed snowmelt tended to concentrate streamflow into a shorter period than usual in the Upper Columbia and Upper Missouri basins and from the Sierras of California.

The report indicated that May to September flows of the upper Missouri and main Yellowstone rivers and their tributaries would range near 150 percent of average, two to three times that of last year. ♦

First national water assessment

The first National Water Assessment, being prepared under requirements of the Water Resources Planning Act of 1965, will present a general appraisal of the adequacy of the Nation's water supplies on the basis of existing data.

Under the Act, new assessments will be made every 2 years under the direction of the National Water Resources Council.

The Department of Agriculture participates in all activities of the council. The Soil Conservation Service has leadership within the Department for water resource programs and is contributing to the 1967 assessment.

SCS has leadership for preparing chapters on watershed land management and on land drainage for the section on water utilization and management. It is contributing to most of the separate chapters on the 20 water-resource regions and has leadership for the Souris-Red-Rainy regional chapter.

In addition to defining present and future problems related to the quantity and quality of water, the national assessment studies are to identify flood and drought problems; identify institutional and organizational problems in the development and management of water and related land resources; provide an inventory of water and related land-resource plans, projects, and investment schedules; provide a report of current and projected use of resources and economic activity in each region; and provide a basis for testing the probable consequences of alternative water policies.

It is expected that future reports will be based on more detailed analyses, using data and information compiled in the comprehensive river basin framework (type I) studies scheduled for completion in all water-resource regions by 1972. ♦

USDA's conservation policies



Secretary of Agriculture Orville L. Freeman presented to President Johnson the first printed copy of the revised and updated conservation policies of the U.S. Department of Agriculture, a booklet entitled, "Resources in Action—Agriculture/2,000."

"The Department's work," he said, "involves help not only to the owners of the three-fourths of our land that is privately held but also the multiple-use management of the 197 million acres of publicly held land in the National Forests and National Grasslands."

"In the light of your call for creative conservation," Secretary Freeman reported to the President, "the Department has thoroughly reviewed its conservation policies and goals."

"This document seeks to set down in sharp outline new conservation policies and the path to their implementation to which each of the diverse agencies that make up the U.S. Department of Agriculture is dedicated."

Secretary Freeman said that the Department's goal is to "help enhance man's total environment—

a unified approach rather than one dealing piecemeal with one resource, or one use, or one purpose at a time." ♦

Planning is basic need in suburbia

Planning—from communities to regions and river basins—to bring about the fullest conservation use of the Nation's resources was the key most often mentioned in the 2-day exchange of ideas at the Soil, Water, and Suburbia Conference in USDA's Jefferson Auditorium in Washington.

Planners, architects, public officials, engineers, contractors, investors, along with several able and articulate citizens, responded to the joint invitation of the Department of Agriculture and Department of Housing and Urban Development to discuss problems of urban growth.

The chairman of the Board of County Commissioners of Multnomah County, Oreg., summed the matter up this way: "The problems of suburbia need careful

management, detailed knowledge, and a willingness to work together by all who are involved."

A citizen who has been contending with local problems in the Washington metropolitan area as chairman of the engineering committee of the Lake Barcroft Community Association, Stuart Finley, emphasized the citizen's dependence on his local government.

"To be effective," Finley, a Virginia resident, asserted, "a citizen's association should have a community of interest, leadership, an active multifaceted program, and an energetic communication with its members. This is feasible. It is surprising what remarkable talents you can find within your community if you just look."

The executive director of the Southeastern Wisconsin Regional Planning Commission, Kurt W. Bauer of Waukesha, Wis., declared that, "intergovernmental planning on a comprehensive, areawide basis is essential—but not sufficient—to sound resource protection and use, and to any meaningful guidance of rural and urban development in the public interest today."

An engineering consultant, William W. Moore of San Francisco, and Dr. Charles E. Kellogg, SCS deputy administrator for soil survey, agreed that building can be done on almost any site—if the builder is willing to foot the bill.

"However," Mr. Moore pointed out, "the cost and risk of doing this varies greatly. The economic factors must be considered, not only in terms of the initial dollar cost of construction, but in the cost of upkeep, the cost of using up natural resources, the effect on recreational facilities, and other social and psychological factors."

Dr. Kellogg, describing the wide variation in soil characteristics, said, "Either by selecting an unsuitable soil for a fixed use, or by selecting an unsuitable use for a specific soil, the risk of loss can be very high."

SCS Administrator Donald A. Williams reminded his listeners that "the history of soil and water conservation in this country has been one of mutual effort based on local initiative and leadership. It has been aimed at local problems and local needs. . . It is not necessary to write a whole new conservation program for suburban areas. The principles of sound soil and water conservation are the same wherever they may be applied."

Mr. Williams added that the Nation's soil and water conservation districts are a ready source of help in planning. ♦

Un séjour en Algérie

(Continued from p. 8)

planted on the terrace berms to assure contour operations. Waterways would be stabilized with stone structures to a zero grade, and trees would be planted on land too steep and gullied for pasture or crops.

The mayor insisted that something be done to improve the water systems for the three towns. So, it was agreed to build two small reservoirs, one each for Bou Assem and Tazbit; build extra water fountains; and equip all fountains with spigots. Merely storing water normally wasted during periods of nonuse would make about three times more water available during the day. There would be a watering trough near each reservoir so the livestock could use the overflow. Bou Assem's water supply was three small springs, and the collection systems at all three were to receive major repairs.

At Hausonvillers, an abandoned spring development, pipeline, and reservoir would be repaired and put back into operation to augment the main water system. A dam that would impound 15 acre-feet of water was planned for domestic and livestock use. The wa-

tershed of the impoundment would be terraced and the waterways stabilized.

At last work begins

By the first of March 1965 administrative and organizational problems at the national level were cleared sufficiently to permit a few projects to start. Detailed plans and field layouts were ready. By this time everyone in the area seemed to know all about the project, and when the mayor asked for 150 men on a Monday morning to start the work, nearly 300 showed up. It was agreed, in the interest of harmony at the moment, to add an additional 100 next Monday, making a total of 250 men on the project.

So, early in March 250 men began work—some on the waterways; some digging terraces with picks and shovels; some on spring development; some on the reservoirs; and others gathering or quarrying stone for structures.

The only machinery in use were the trucks to haul tools, cement, and stone.

Fehreni Abdenour, *sous-prefet*, came and turned "a first spadeful of earth" to officially open the project. He then made a short speech expressing keen interest in the program and promised complete support. He displayed concern over the soil conservation and water development needs of the Kabylie.

Abdenour was a former school teacher, and he knew the value of teaching by example. As a political leader he knew well the problems associated with unemployment. As a concerned citizen, he frankly pointed out that something had to be done to stop the rapid destruction of soil resources. To Abdenour, this project and the others to follow were steps, small though they were, in the right direction.

The Algerian Forestry Service asked us to restore to production

a tree nursery destroyed and abandoned during the revolution. This project was opened, a few days after the Hausonvillers project, with 40 workmen. A few more than 100,000 eucalyptus trees were grown and ready for field planting by November.

Additional projects

About the first of July the go-ahead was given to start additional projects. Nine more erosion-control projects, similar to the Hausonvillers project, and six tree planting projects on public land were started. In all there were 17 "Food for Work" projects employing 3,300 men in the Grand Kabylie by the end of the year. Plans were completed on 12 additional projects that could have employed another 3,000 men.

Work progressed well for the rest of the season. The Hausonvillers project was expanded from about 250 acres to more than 1,000 acres. On several occasions farmers inquired if they could get their land included in the "project." To us, this was a healthy sign.

Rains during the first winter put the terraces and waterways to a real test. Only minor damage resulted on a few new terraces during a storm that yielded between 5 and 6 inches of rainfall in a 24-hour period.

Perhaps the most spectacular accomplishment on any of the projects in the Kabylie was the water-supply dam at Hausonvillers. Ninety men built a 5,500 cubic meter earth dam with picks, shovels, hand tampers, and 30 wheelbarrows.

It was never intended to construct the dam with so few wheelbarrows, but that is the way it worked out. Everything was ready to begin construction—but no wheelbarrows. "They would be along shortly"—and rather than delay work, 30 wheelbarrows were purchased locally. Twenty were put on the dam at Hausonvillers and 10 on a smaller dam on the

project at Les Ouadhais. Later, 10 additional wheelbarrows were added at Hausonvillers.

The fill material was compacted with hand tampers. Water was hauled to keep the moisture content optimum for compaction. The upstream face of the dam was ripped for protection against wave erosion and because heavy draw-down was expected during the dry season. The emergency spillway was cut through solid stone with hand drills, hammers, chisels, and wedges. Construction was completed in early July 1965—and then 250 wheelbarrows arrived!

At first French and Algerian technicians seemed a bit skeptical that technicians from the United States, the land of mechanization, were planning to construct terraces and earth dams using hand labor. At times, early in the program, we felt their cooperation was polite tolerance. Later, when it became evident that real and tangible results were coming from the whole approach, the attitude of the technicians at the local level seemed to change.

After the program was well underway in the Kabylie, the *prefet*, *sous-prefet* Abdenour, and Mr. Lamari, chief of the Forestry Service in Tizi Ouzou, with whom we worked very closely, all were transferred to new positions. It is significant to note that the replacements for these men—all key men as far as we were concerned—gave equally as good cooperation.

The *prefet*, the *sous-prefets*, and the mayors liked the program because it furnished employment and tackled acute soil erosion problems. Throughout the tour we found these officials cooperative. This was an action program that produced results. Others came with promises of help, but as one official put it, "it's just so much talk."

All in all, we were well received in the Kabylie of Algeria, and even by the most modest assessment, the cooperation was good. ♦



Attracting Birds: From the Prairies to the Atlantic. BY VERNE E. DAVISON. 1967. Thomas Y. Crowell Co., New York. 252 pp., illus. \$6.95.

Thirty years of painstaking observation of birds and bird feeding, coupled with a like span of experience in wildlife habitat management as a biologist of the Soil Conservation Service, prepared Verne E. Davison to write a thoroughly unique and original book on a much-worked subject of wide interest.

At his own home in Alabama and in Georgia, and at many study points in the Southeastern and Central States, Davison "tested" the preference of birds for different kinds of foods by exposing samples under comparable conditions and noting which ones different species chose or rejected.

The results of his own observations combined with information from more formal "food habits" research (mainly by the Fish and Wildlife Service, formerly the Biological Survey) clearly indicated that different kinds of birds do prefer different kinds of food.

In this book, he rates some 700 plants as "choice," "fair," or "unimportant" as foods for 400 species of birds. Alphabetical listings of both birds and plants enable the user to find and compare information for species of particular interest to him.

Davison's studies and experience have convinced him that "food is by far the most significant influence in a bird's life." Second in importance are suitable nesting sites. The book includes a chapter on the nesting requirements of birds, with suggestions for providing suitable plant cover and specifications for nesting boxes.

The book is a demonstration of

the practical application of detailed knowledge to wildlife management problems that is the stock-in-trade of conservation biologists. It is the summation of the fruits of one man's lifelong devotion to a special interest, for which countless homeowners and others with an interest in birds will be grateful.—B. O.

Plant Environment and Efficient Water Use. EDITED BY W. H. PIERRE, DON KIRKHAM, JOHN PESEK, AND ROBERT SHAW. (1966). *Amer. Soc. Agron. and Soil Sci. Soc. Amer., Madison, Wis.* 295 pp., illus. \$6.00.

This 13-chapter publication is a comprehensive review of significant research information on the role of water in American agriculture and ways of achieving more efficient use of it in crop production. It presents the papers that were given at a symposium held in 1965 on the subject. The authors are recognized leaders in the field of research on all aspects of water, plant, and soil relationships.

The first two chapters consist of general information on the water problem and its perspective in agriculture. Both include many good examples of the amounts used by various users and the variations in rainfall on a transect from Akron, Ohio, to Cheyenne, Wyo.

Seven chapters deal with basic information on such subjects as evapotranspiration, root environment, fertility, production, and water movement in the soil.

Three chapters discuss the principles of water management and increasing the efficiency of water use through improved soil and crop management practices. All three contain recent research results on reduction of water losses by various conservation measures, such as tillage, planting techniques, irrigation water management, and other proved practices.

This publication contains a wealth of information that can be

used by many people, those interested in agriculture as well as those who have other interests in the role of water for other uses.—B. D. BLAKELY, *head agronomist, SCS.*

New publications

Outdoor Recreation Trends. By U. S. BUREAU OF OUTDOOR RECREATION. 1967. U.S. Dept. Int. 24 pp., illus. \$0.40. A graphic representation of trends in summer outdoor recreation activity, comparing data obtained in 1965 by the Bureau of Outdoor Recreation with those for 1960 published in the report of the Outdoor Recreation Resources Review Commission.

The 5-year comparisons prompt the BOR to project a fourfold increase in recreation activity by the year 2000, compared to a threefold increase projected by ORRRC.

The five most popular activities in 1965 were, in order, walking for pleasure, swimming, driving, games and sports, and bicycling. ORRRC reported the order in 1960 as driving, swimming, walking, games and sports, and sight-seeing.

Know the Soil You Build on. By A. A. KLINGEBIEL. 1967. USDA Agr. Inf. Bul. 320. 14 pp., illus. Effectively illustrated, this bulletin alerts the prospective home buyer or builder to avoid poor soil-site pitfalls and gives clues on what to look for. It presents information on the ideal soil for most uses, provides concrete examples of homes destroyed or damaged because they were built on bad soil sites, and recommends the use of soil surveys before going ahead with building or buying homes.

Resources in Action—Agriculture/2000. 1967. USDA. 19 pp., illus. An official statement of the Department's conservation policies. See story on page 19, and the Administrator's statement in the July issue of *Soil Conservation*.

The Third Wave. 1967. U.S. Dept. Int. Conservation Yearbook No. 3. 128 pp., illus. \$2.00. The third yearbook of the Department of the Interior in the profusely illustrated (with color) format initiated in 1965.

An Economic Survey of the Northern Lake States. By R. A. LOOMIS and M. E. WIRTH. 1967. USDA Agr. Econ. Rpt. 108. 132 pp., maps, charts.

The 1964-65 Cropland Conversion Program: A description and appraisal. By JAMES VERMEER. 1967. USDA. Agr. Econ. Rpt. 111. 39 pp.

Soil surveys

Jersey County, Illinois. REPORT BY J. B. FEHRENBACHER, UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION, AND C. E. DOWNEY, SOIL CONSERVATION SERVICE. 1966. 80 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by J. B. Fehrenbacher, A. H. Beavers, R. B. Grossman, and P. R. Johnson, University of Illinois Agricultural Experiment Station, and F. L. Awalt, F. W. Cleveland, C. E. Downey; C. C. Miles, L. L. Miller, Richard Rehner, and B. J. Weiss, Soil Conservation Service.

Tucker County, Part of Northern Randolph County, West Virginia. By CRAIG K. LOSCHE, FOREST SERVICE, AND W. W. BEVERAGE, SOIL CONSERVATION SERVICE. 1967. 78 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by Craig K. Losche, Robert W. Douglass, James C. Byrne, Charles R. Gass, Albert F. Ike, Jr., Forest Service, and W. W. Beverage and John W. Warner, Jr., Soil Conservation Service.

Arenace County, Michigan. By C. E. REDMOND AND C. A. ENGBERG. 1967. 142 pp., illus., maps 3.17 inches to the mile (1:20,000). Fieldwork by W. H. Colburn, Michigan Department of Conservation, and E. P. Whiteside, Karl Pregitzer, Sidney Pollack, and B. L.

Allen, Michigan Agricultural Experiment Station.

Beaver Creek Area, Arizona. By JOHN A. WILLIAMS AND TRUMAN C. ANDERSON, JR., FOREST SERVICE. 75 pp., illus.; maps 2 inches to the mile (1:31,680). Soils surveyed by Truman C. Anderson, Jr., Andrew A. Leven, John A. Williams, Darwin B. Crezee, and Wesley E. Suhr, Forest Service.

Columbia County, Pennsylvania. By PAUL H. PARRISH. 1967. 139 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by Paul H. Parrish, Warwick M. Tinsley, Robert P. Zimmerman, Robert K. Craver, Robert Cruikshank, and W. R. Byrne.

Tate County, Mississippi. REPORT BY JERRY S. HUDDLESTON. 1967. 85 pp., illus.; maps 4 inches to the mile (1:15,840). Soil surveyed by R. C. Carter, H. S. Galberry, Jerry S. Huddleston, A. E. Thomas, and W. L. Watts.

Chicot County, Arkansas. By HARDY CLOUTIER AND CHARLES J. FINGER. 1967. 58 pp., illus.; maps 3.17 inches to the mile (1:20,000). Field survey by Hardy Cloutier, Fred C. Larence, and H. Wade Long.

Greer County, Oklahoma. By JIMMIE W. FRIE, R. C. BRINLEE, AND RICHARD D. GRAFT. 1967. 72 pp., illus. maps 3.17 inches to the mile (1:20,000).

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From the Administrator:

Soil, Water, and Food for Peace



While we may regard the physical needs of man as being on a lower level than social or personal values, they are supremely important if they cannot be provided. In reality, man lives for bread alone—*when there is no bread.*

We in America are blessed with an abundance of food, but for most of the world today the basic physical need for food, water, and shelter is predominant. When there is lack of food, people are restless. They fight to stay alive. They create an unstable society in which there can be no peace.

Four years ago the Food and Agriculture Organization of the United Nations sponsored a great World Food Congress. The target of that meeting was to find ways and means of providing an adequate, nutritious diet for every man, woman, and child in the world. It was concluded at that time that the technology and know-how exist to make it possible to produce the needed food and fiber.

In May of this year another great international meeting was held on Water for Peace. We stated then that water is essential for economic stability, agricultural sufficiency, and for prosperity and progress. That conference, too, signified a faith in victory over starvation and want.

We have long known that soil and water are inseparable. Secretary Freeman stated at the Water for Peace Conference that water resources and land resources cannot be isolated from each other. They are the basic factors in food production.

Soil, water, and food, therefore, become the key elements in our striving for world peace.

Millions of acres of potentially good cropland throughout the world are eroded, waterlogged, seriously damaged by floods or salinity, deficient in required nutrients, or parched beyond significant agricultural value. These lands can be made productive as, indeed, many of them once were. They can contribute to alleviating the hunger that stalks so much of the earth.

To that end, the Soil Conservation Service is engaged in a program of technical assistance to the developing countries. Over a period of more than 30 years, we have developed in this country a cadre of skilled scientists and technologists trained in every discipline that can help to diagnose land and water problems and prescribe successful treatment and use. We are sharing the knowledge and skills of these experienced experts with countries where increased food production is essential to win what President Johnson has described as the "race with disaster."

My visits to Turkey, India, Thailand, Viet Nam, Brazil, and other countries have impressed me with the importance of accelerating progressive agricultural practices in the developing nations.

During the past 4 years, SCS has provided technical assistance and training to 20 countries under Participating Agency Service Agreements in cooperation with the Agency for International Development. Before this arrangement was devised, which enables

SCS people to serve in foreign lands under the continuing direction of our own organization, SCS had, for some 25 years or more, contributed to international programs by placing our technicians on loan to AID and its predecessor agencies.

At the close of the 1967 fiscal year, the Service had 28 specialists in various aspects of soil and water conservation working in eight countries. We anticipate that by the end of fiscal year 1969, we will have 60 people working in 12 countries.

This assistance is directed primarily to giving advice and counsel in the field of soil and water management. In addition, SCS has also been providing training opportunities in the United States for technicians from other countries. Several thousand of these people have studied our techniques and procedures. Many of them are now in positions of responsibility in their countries and are the key people with whom our overseas personnel are working.

Technological development is a gradual, long-term process that demands patience and diligence from all participants. In every case, we must begin by understanding the nature of the land—the soil, the landscape, the water supply—and the nature of the people—their culture and their technological experience.

Once the basic food needs of the world are met, the chances for peace and prosperity for all people are improved. We recognize that this cannot be accomplished without the dedicated interest of our people who accept overseas assignments.

Our fine staff now in foreign lands is demonstrating that people everywhere will work to help themselves if given the encouragement, the hope, and the know-how to get things done.

D. A. WILLIAMS



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The Crider Memorial Garden of conservation plants

The Crider Memorial Garden at the National Plant Materials Center, Beltsville, Md., was dedicated July 7 to honor Dr. F. J. Crider and all who have helped in the search for improved plants to fit the requirements of conservation problems.

The garden contains more than 200 samples of conservation plant materials selected through the observational program now carried on in 20 SCS plant materials centers that span the continental United States and extend to Hawaii and Puerto Rico. Additional species and strains used extensively in conservation work are also included.

Dr. Crider was director of the Boyce-Thompson Institute's Arizona station before he started his Federal career in soil conservation work as regional leader of nursery activities in the Southwest region in 1934. With his transfer to Washington, D. C., in 1935, he became head of conservation nurseries for SCS. In 1938 he took charge of the National Observational Nursery Project at Beltsville, Md.

In 1951, when he retired, he received the U. S. Department of Agriculture's Superior Service Award "For his leadership in developing and carrying out nursery observational studies"

Combined efforts of SCS technicians and research workers of other agencies have increased the effectiveness and intensity of the program initiated by Dr. Crider nearly 30 years ago. ♦



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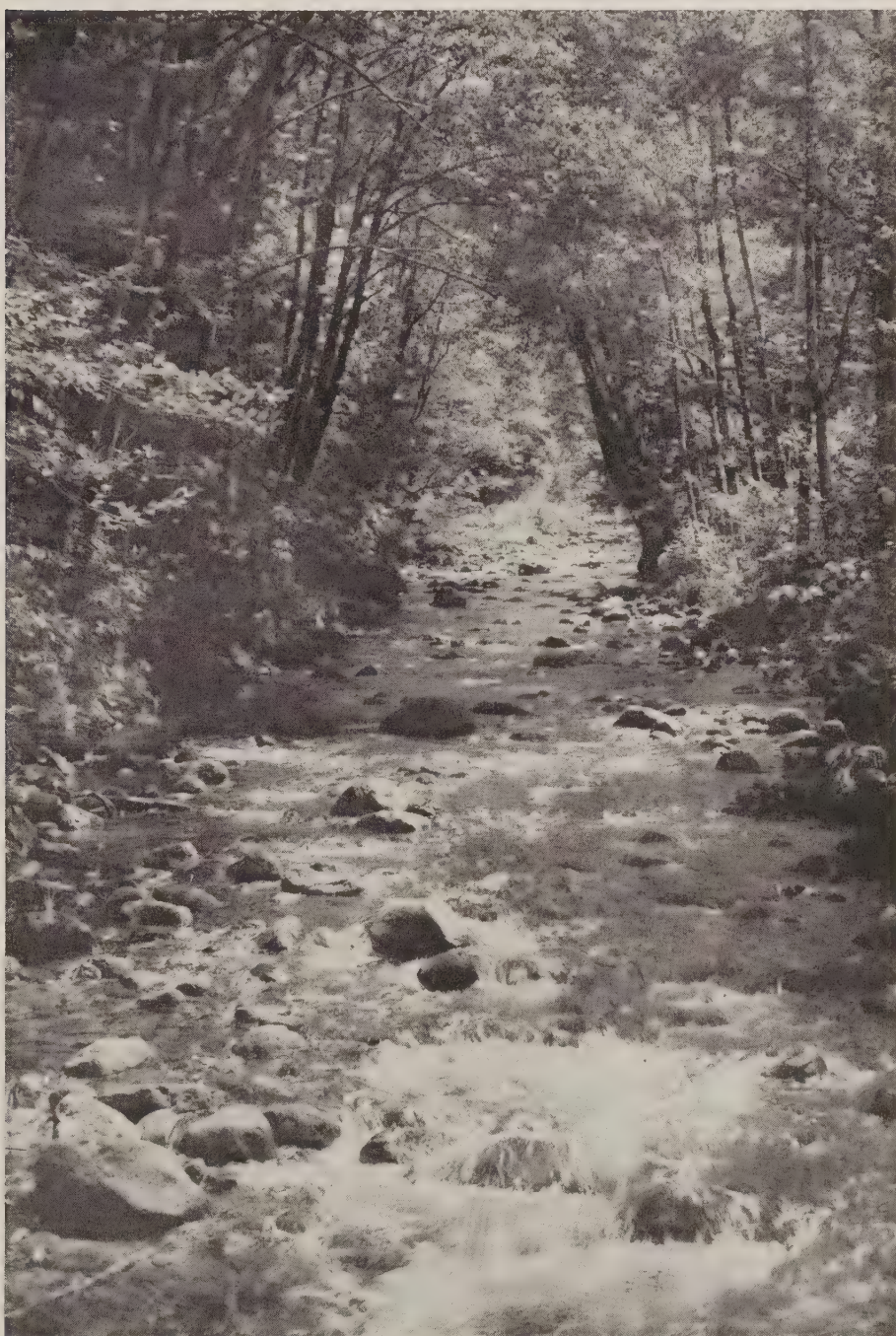
SEPTEMBER 1967

Vol. 33 No. 2

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

A LOOK AT WATER QUALITY

- Sources of pollution
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- Soil as a filter
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- A sediment control standard
Page 33
- Action for clean streams
Page 35



SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A clear running stream is evidence of good soil and water conservation practices on the watershed lands that contribute to its flow.

Clean water

In this issue we begin an exploration of the relations of rural land management to the quality of the Nation's water supply.

The subject is part of our larger concern with the quality of the total human environment.

The problem: We begin with a researchers' review of the known facts, good and bad, about the problem. Dr. C. H. Wadleigh, ARS, appraises (p. 27) the sources of pollution from agricultural land. And Dr. Sam R. Hoover, ARS, sums up (p. 30) information about the land itself as a purification system.

The solution: Then we see some examples of positive action already under way to safeguard water quality.

SCS has helped food processing plants in the Northeast (p. 31) to dispose of effluent safely in fields and woods.

Recognizing sediment as a major pollutant, Hawaii has adopted (p. 33) a water-quality standard that recognizes soil conservation practices as the accepted means of compliance.

And three soil conservation districts in West Virginia have each selected a stream and begun a coordinated program to clean it up (p. 35).

This review clearly indicates that soil and water conservation itself is a major defense against water pollution from agricultural land.

soil conservation

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Can we keep it clean?

By C. H. Wadleigh

*Director, Soil and Water Conservation
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Agricultural Pollution of Water Resources

Agriculture is often accused, sometimes rightly, sometimes wrongly, of lowering the quality of lakes, streams, and rivers and even ground water with various kinds of pollutants.

The Senate Select Committee on National Water Resources in Committee Print No. 9 specifies eight general categories of water pollutants:

- (1) Sediments.
- (2) Sewage and other oxygen-demanding wastes.
- (3) Plant nutrients.
- (4) Infectious agents.
- (5) Organic chemical exotics.
- (6) Salts and mineral substances.
- (7) Radioactive substances.
- (8) Heat.

Although agricultural operations are not important to the last two categories, farming and the processing of farm products frequently do contribute to the other forms of pollution.

Agricultural pollutants are seldom discharged directly into streams, however, as often happens with effluents from industrial plants and municipal sewage systems. The unwanted substances originate, or are spread, widely on the land surface and are carried mainly in overland runoff to

streams and lakes. With increasing demands for clean water, greater conservation efforts are needed to reduce this agricultural pollution.

1. Sediments

Sediments are the main burden of pollutants in surface waters. The Mississippi River delivers more than 500 million tons of sediment into the Gulf of Mexico during the average year. This amount is about one-half the average annual sediment delivered to the oceans by the rivers of the continental United States.

Carl Brown, formerly deputy administrator for watersheds, SCS, stated before the National Conference on Water Pollution that only about 1 ton in 4 of the silt produced by erosion ever reaches the ocean. The total sediment added to streams in the United States, then, must amount to about 4 billion tons a year. Agriculture is still losing a lot of soil, and a lot of water is being muddied. The Senate Select Committee report estimates that such suspended solids in the Nation's streams amount to at least 700 times the loadings caused by sewage discharge.

Aside from filling stream channels and reservoirs, suspended sediment makes necessary expen-

sive treatment for municipal and industrial water supplies. Sediments impair oxidation of organic pollutants in streams. They cause erosion of power turbines, pumping equipment, and other structures. They reduce fish and shellfish populations by blanketing their nests, spawn, and food supplies.

The Potomac River, long known as a mud-carrying stream, drains 11,580 square miles in Maryland, Pennsylvania, West Virginia, Virginia, and the District of Columbia.

Studies on the Potomac Basin as a whole indicate gross soil erosion of about 50 million tons a year, and of that, sediment delivered into the Potomac estuary amounts to about 2½ million tons a year.

There is evidence, however, that activities outside of agriculture are responsible for major sediment deliveries into the Potomac. Suburban and industrial development is active on the outskirts of Washington, D.C. Bulldozers frequently remove all of the vegetation from hundreds of acres of land, and then the area is left idle for many months, or even years, until additional money becomes available for construction. The exposed subsoils in these suburban areas are extremely erodible, and there are

frequent erosive rainstorms. Some estimates indicate that 25 percent of the sediment coming into the lower estuary of the Potomac now arises from suburban construction sites.

2. Organic wastes

Sewage, animal wastes, and effluents from dairies, pea vineries, and canneries impair the quality of water mainly through their high biochemical oxygen demand.

Biochemical oxygen demand (BOD) refers to the amount of oxygen required to decompose the organic matter present in a sample of water. It is expressed by the amount of oxygen used when a sample of the water is incubated for a 5-day period at 68° F.

In such tests, samples not using more than 1 p.p.m. of oxygen in 5 days can generally be considered very pure, 3 p.p.m. used suggests fairly clean water, but water using 5 p.p.m. or more of oxygen is of doubtful purity.

It is not uncommon in a stream carrying appreciable wastes for the dissolved oxygen to drop down to 1 to 3 p.p.m. during the summertime. In the low flows of a sluggish stream during warm weather, there will be little oxygen available for either the respiratory needs of fish life or the oxidation of organic pollutants.

Untreated municipal sewage has a biochemical oxygen demand in the neighborhood of 100 to 400 p.p.m. Runoff carrying wastes from barnyards and feedlots may have a BOD varying from 100 to 1,500 p.p.m., depending on the dilution and degree of deterioration of the wastes. Wastes from vegetable canneries may vary in BOD from 100 to 10,000 p.p.m. A concentrated waste such as the juice from pea vine ensilage has been recorded as having a BOD of 75,000 p.p.m.

In evaluating the effects of farm wastes, we must keep in mind that most domestic animals daily produce fecal matter having greater

biological oxygen demand than that of a man, although the BOD in relation to weight of effluent varies greatly among species. One cow, for example, will produce manure equal, in terms of BOD, to the sewage of 16.4 people. In studies at the National Institutes of Health, the following animal equivalents to human sewage production were determined.

Animal	Solid Waste Production	
	Gms/day	Population equivalent
Man	150	1.0
Cow	23,600	16.4
Pig	2,700	1.9
Sheep	1,130	2.45
Chicken	182	0.014

These data mean that a feedlot handling 1,000 head of cattle would have the same waste-disposal problem as a small city with a population of 16,400. The city would probably have sewage treatment facilities, but the feedlot is usually not so equipped.

We know from excellent studies at Pennsylvania State University that one of the best ways to purify polluted water is to let it percolate down through the soil. In fact, this is precisely the principle used in sand and charcoal filters in sewage treatment plants.

This suggests that areas where animals are concentrated should be provided with diversions so that runoff flows onto wooded or grass areas having high infiltration capacities. If contaminated runoff is prevented from reaching streams by overland flow, surface water supplies are protected. Normally, ground water is amply safeguarded by the filtering effect of the soil, although some soils, such as coarse sands or those that are shallow over fractured rock, do present problems of ground-water contamination.

Traditionally, the place for manure has been on the land. Recent attempts to dispose of it in lagoons have been unsatisfactory. Additional research is needed to develop more effective systems. Studies indicate that the benefits to soil fer-

tility from manure application under modern farming conditions do not justify the cost of spreading.

But the livestock operator must contend with a daily supply of a product—manure—that he can't sell, can't give away, and can't burn. It is obvious that there is an urgent need to develop more economical ways and means of handling manure to provide some benefit to the land while eliminating possible pollution from farm runoff.

3. Plant nutrients

Complaints are rife that many rivers, ponds, lakes, and reservoirs are being ruined by the tremendous growth of algae and other water plants, forming what is known as "algal blooms." Not only are these "blooms" unsightly, but death and decay of the plants result in exceedingly unpleasant odors. Furthermore, the decaying plant life robs the water of its dissolved oxygen. The water becomes nearly uninhabitable for fish and unsavory for recreation.

These algae, like all plants, must have mineral nutrients in order to grow. In most waters the main limiting factor for algae growth is phosphorus, since other elements such as nitrogen, potassium, calcium, and magnesium are present in relatively abundant supply.

Available evidence indicates that these algae will grow vigorously if the water contains only 0.1 part per million of phosphorus. To completely inhibit algae growth the level of phosphorus in the water must be below 0.02 p.p.m.

The farmers of the United States apply millions of tons of fertilizers containing phosphorus on their farms, and some people may think that excessive phosphorus in surface waters is due to runoff from these fertilized fields.

But let us take a hard look at the sources of phosphorus.

We know that considerable phosphorus is present in domestic sewage from the use of detergents for washing. In fact, on the aver-



Sediment not only spoils recreational value but robs a lake of its capacity to store water for any purpose.

age, the amount of phosphorus delivered in metropolitan sewage effluent amounts to about 2 pounds per person per year. In other words, the sewage effluent from a city of 1 million people will contain 1,000 tons of phosphorus a year.

Phosphorus is getting into streams from farmland; however, it gets into surface water only through runoff and erosion of topsoil. Runoff from feedlots and barnyards that flows directly into stream channels may be a source of phosphorus. Barnyard waste usually carries about 1,000 p.p.m. of phosphorus. But we know that water seeping down through the subsoil or moving laterally through the soil carries little phosphorus.

Soil particles have a tremendous affinity for holding onto phosphate molecules. Even when the fine suspended particles in a river contain 1,000 p.p.m. of phosphorus adsorbed on their surfaces, the phosphorus in true solution may be only 0.005 to 0.010 p.p.m. Many water samples have been analyzed without making any distinction between phosphorus that was in true solution and that which was adsorbed on the suspended sediment.

We must conclude that the best way to control the phosphorus burden in streams that arises from agricultural practices is to use soil conservation practices and structures that minimize runoff and sediment delivery from fields and farmsteads.

4. Infectious agents

There is evidence from bacteriological studies on many of our otherwise attractive streams and lakes that they are never safe for swimming because of the prevalence of pathogenic bacteria. Some evidence indicates that most of the bacteriological pollution in a stream comes from farm runoff.

The presence of coliform bacteria in water has been used as an indicator of bacteriological pollution for about 75 years. Although the coliform bacteria are not pathological, their presence shows infectious bacteria might also be present.

Coliform bacteria can enter the water from animal wastes or from soil runoff, since some coliforms persist in soil. A trained technician with a microscope can distinguish between fecal coliform bacteria and those coming from soil.

Streptococcal bacteria are also normally present in fecal effluent. Studies indicate that in effluent from animal wastes, the ratio of coliform to streptococci bacteria is always less than 1 to 1 for such farm animals as pigs, turkeys, cows, chickens, sheep, and ducks. For human effluent, the ratio usually exceeds 4 to 1.

The magnitude of this ratio enables a bacteriologist to determine whether the bacterial pollution is coming from farms and farmyards or from urban centers. If the ratio is less than 1, the pollution is coming from nonhuman sources; if it exceeds 2.5, the bacterial pollution is coming from human sources. Values between 1.0 and 2.5 suggest that pollution is a mixture of human and nonhuman sources.

Such observations as we have indicate that the bacterial pollution of streams in some cases is derived from animal rather than human sources.

We need much more information on the undesirable bacteria in water. Veterinarians tell us that if spirochetes are present in water, there is a good chance that they were derived from wild animals, such as skunks and coons, creatures known to carry these infectious organisms and deliver them into the water into which they stroll. By contrast, our farm animal populations are comparatively healthy due to a relatively high level of veterinary supervision.

5. Organic chemical exotics

The Senate Select Committee on Water Resources states that organic chemical pollutants constitute "a water problem of great concern which will increase manifold in significance in the future..." Certainly, the headlines that we have seen about fish kills in the Mississippi River, and similar events, emphasize the great public concern over (agricultural) pesticides and herbicides as pollutants of surface waters.

Synthetic detergents, petroleum derivatives, and O-nitrochlorobenzene are some examples of organic chemical pollutants that may originate from industrial and metropolitan areas. There are also instances where pesticides found in rivers actually entered as effluent from industrial plants.

It is proper that the public should be very much concerned over possible poisoning of the environment. But water pollution from use of agricultural pesticides is not as extensive as some reports would lead us to believe. Leo G. K. Iverson, assistant director, Plant Pest Control Division in the Agricultural Research Service, recently presented a paper before the American Association for the Advancement of Science on "Monitoring of Pesticide Content in Water in Selected Areas." His findings indicate that even in areas where sizable quantities of chlorinated hydrocarbons have been used on large acreages, only traces of these pesticides were found in the runoff water.

For example, on a study area at Greenville, Miss., where endrin was used to control cotton pests, a total of approximately 22.5 pounds per acre was applied over a period of 9 years. Residues in the soil at the end of the period amounted to approximately 1 p.p.m. in the surface 3 inches, equivalent to 0.3 pound per acre or about the amount applied in a single application. Water from the area which had accumulated in a nearby slough was sampled on 19 different dates, and measurable residues were found on only six occasions, in amounts ranging from 0.07 to 1.49 parts per billion.

However, we must continue to be alert towards minimizing any potential dangers from the use of these chemicals.

6. Salts and minerals

Water moving through the soil picks up natural salts and minerals. Drainage from acid mine wastes is
(Continued on p. 40)

Disposal of waste on farmland

By Sam R. Hoover

Assistant deputy administrator, Nutrition, Consumer, and Industrial Use Research, Agricultural Research Service

Land with a good crop cover is a cheap, readymade oxidative system for the safe disposal of organic wastes such as remain after the usual treatment of effluent from food and fiber processing plants and from municipal sewage systems.

When such wastes are treated by aerobic or anaerobic processes to remove up to 90 percent of the biological oxygen demand (BOD), the effluent still contains some organic matter and usually nitrogen, potassium, phosphate, and other plant nutrients.

The idea of waste disposal on land with the concurrent growth of crops irrigated by the effluent is not new. It has long been practiced in Germany for sewage treatment and is currently practiced at several places in the United States.

Cheese whey and milk plant wastes have been sprayed on pasture successfully. A major frozen-food producer has sprayed effluent on crops and in woodland for many years. The rapid production of pine seedlings irrigated by paper mill effluents has had preliminary study and appears to be promising.

An acre of soil a foot deep has a volume of 43,560 cubic feet, of which roughly half is pore space that would be equivalent to a tank of about 1,600 gallons capacity. If the soil can be kept in an aerobic oxidative condition, it has a great capacity for absorption and microbial utilization of organic matter.

Recent studies of the disposal of treated municipal wastes at Pennsylvania State University by Dr. L. T. Kardos and associates are

among the few research investigations of such systems. Here, an interdisciplinary approach is being taken in studies of the disposal of the effluent from a sewage treatment plant on agricultural and forest lands.

Chlorinated effluent was applied to corn, wheat, red clover, alfalfa, idle farmland, mixed hardwoods, and red pine plantations at rates of 1 and 2 inches per week through a revolving sprinkler irrigation system. Concentration of nitrate in the soil water below 12 inches was reduced 68 to 80 percent from that of the effluent applied to the plots; phosphorus, 99 percent; and detergent, 95 to 98 percent.

Nitrogen, phosphorus, and detergents are primarily responsible for the degradation of stream quality. It was estimated that, on plots receiving 2 inches of effluent per week, 1 million gallons per acre of high quality water was recharged to the ground-water reservoir for potential reuse during a 5½-month period.

As water reuse becomes increasingly important, requiring a higher degree of treatment and greater removal of plant nutrients than previously considered necessary, the economic value of full treatment of sewage and agricultural wastes will become more obvious. Final treatment through disposal on the land in many cases will have the additional value of water reclamation. ♦

Historical corner

George Washington made a survey and prepared statistics on agriculture in five States in response to a request from England. ♦

Food processing companies in the Northeast are turning to fields and woods as a way to dispose of waste water from their plants without polluting local streams.

The soil and vegetation act as purifying agents when the water is sprayed on the land with irrigation sprinklers.

Various systems, planned with the help of the Soil Conservation Service, agricultural colleges, and others, have been used by the companies to screen and filter the water.

W. L. Wheatley Inc., of Clayton, Del., set aside 75 acres of its farm near its processing plant for use as a filtration medium to avoid pollution of nearby Providence Creek.

The water used in the processing plant—600,000 to 750,000 gallons a day in season—is spread over the 75 acres through ordinary irrigation pipes. Twenty-three lateral overhead pipes, containing 373 sprinkler heads, dispose of 650 to 750 gallons a minute.

The company uses 30 to 34 sprinkler heads at a time. At the end of each hour, the water is au-

tomatically shifted to another set of laterals and their sprinklers.

Before entering the sprinkler system, the water is screened to remove the organic matter that accumulates as the vegetables are cleaned—corn shucks and silk, pea pods and other such waste material. The material is given to farmers for hog feed.

Besides the organic matter, the water leaving the plant contains chemicals used in processing the vegetables, including chlorinating fluids, detergents, and sodium salts. They make such a small percentage of the total volume of water that they do no noticeable harm to the organic matter or to the growing vegetation in the 75-acre filter field, according to Walter Ake, field manager.

As a soil conservation district cooperator, the company has had the help of SCS in preparing conservation plans for its several farms.

The filter field is planted to Kentucky 31 tall fescue, orchardgrass, and reed canarygrass. The soil had been kept in good condition by conservation practices, so

Soil cleanses waste water from food processing plants

At peak operation, the Wheatley processing plant disposes of 600,000 to 750,000 gallons of waste water a day on its 75-acre filter field. John S. Richards, plant engineer, supervises the operation.



it is porous and permeable enough to absorb a large volume of water at a fast rate.

"After 3 years of operation, we see no ill effects, either to the soil or to the vegetation," Mr. Ake said. "The percolation rate has been maintained. We do not harvest the grass but mow it twice a year and let the grass remain on the land as a mulch. The waste water has had no bad effect on grass."

This effort to avert the pollution of Providence Creek was not accomplished without considerable expense. John Richards, plant engineer, says that the 75 acres of top quality farmland is valued at \$800 an acre. The sprinkler equipment cost \$55,000.

The Seabrook Farms Company, a large grower and processor of vegetables in southern New Jersey, sprays the waste water through large, rotating nozzles in a woodland. Here, too, the soil is the cleansing medium. As is usual in such operations, organic matter is screened out of the water before it enters the irrigation systems.

Before the system was installed a dozen or so years ago, Marco L. Markley, SCS soil scientist, classified the soils for the company and prepared soil profile descriptions to make sure that the area could absorb the large volume of water coming from the processing plant. Rutgers University faculty members also helped guide the company in setting up the disposal system.

P. J. Ritter Company, Bridgeton, N. J., also uses the soil and its vegetation to cleanse the water from its cannery. The proposed disposal site also was checked by Markley before the system was installed. As a result of his survey, the company altered its plans to avoid a subsurface layer of clay that would interfere with the passage of water.

At the Ritter place, too, Rutgers professionals helped in establishing the system and in making investigations of the site from time to time.

After 5 years of use, the soil of the Ritter site was found by R. B. Alderfer, professor of soils at Rutgers, to be better than at the start. The percolation rate continued high. Alderfer found a large increase in the number of earthworms in the soil. Presence

of the earthworms, of course, has helped maintain or increase the rate of water absorption.

Other food processing companies are using the land to solve a pollution problem that only a few years ago seemed beyond practical solution. ♦

Centennial conservation field day

More than 350 Boy Scouts took part in the Nebraska Centennial Conservation Day held this spring at the Cornhusker Scout Reservation near Humboldt, Nebr. The event was sponsored by the Lincoln chapter, Soil Conservation Society of America, in cooperation with the Cornhusker Council, B.S.A.

Working in crews of 10 to 20, the boys put reed canarygrass and prairie cordgrass sod around the edges of their recreation lake, planted black walnut and hackberry trees, cut out undesirable brush and piled it for game shelters seeded reed canarygrass, and switchgrass in gullied areas throughout the reservation, and established a nature trail through their 80-acre woods.

A project like this generates a lot of community spirit. Leonard Pewther, director of program for

the council, said 68 adults from 18 troop committees and 25 Soil Conservation Service people donated their services for the Conservation Day activities.

"After all, it's their camp," said one "boss man," Scoutmaster Rankin Carstens of Beatrice, who has 85 boys in his troop. "They come here every summer, and they feel a sense of ownership. It makes them feel good to do something to make the camp better."

The 800-acre Cornhusker Reservation formerly was in cropland and other farm uses. Henceforth, the rolling terrain will be devoted to just one crop—growing boys. A soil and water conservation plan has been developed by the council officers and executive staff with SCS help that will meet the needs of thousands of curious minds, restless hands, and roaming feet in the years to come. ♦

Boy Scouts spot-sod reed canarygrass along shoreline of lake at Cornhusker Reservation.





A soil conservation program approved by the conservation district is accepted as compliance by the landowner with the water-quality standard on sediment pollution.

Hawaii water-quality standards seek control of sediment pollution

By Francis C. H. Lum

Watershed planning staff leader, SCS, Honolulu, Hawaii

Sediment resulting from the erosion of building sites and agricultural land is recognized as a major form of water pollution, and soil conservation practices are specified as the accepted means of control, in water-quality standards adopted by the State of Hawaii and submitted to the Department of the Interior in conformance with the Water Quality Act of 1965.

Included in the proposed water-quality standards formally adopted by the Department of Health, the State-designated water pollution control agency, is the following "basic standard" applicable to all coastal water areas:

"6. Free from soil particles resulting from erosion on land involved in earthwork, such as the construction of public works, highways, subdivisions, recreational, commercial, or industrial developments, or the cultivation and management of agricultural lands.

This standard shall be deemed met if it can be shown that the land on which the erosion occurred or is occurring is being managed in accordance with soil conservation practices acceptable to the Director of Health, and that a comprehensive conservation program is being actively pursued, or that the discharge has received the best practicable treatment or control or such lesser degrees of control as will provide for a water quality commensurate with the classified use of the water."

While the Department of Health as the responsible State agency will determine the adequacy of treatment, it will rely on the advice of soil and water conservation districts and the Soil Conservation Service as "expert" agencies with respect to soil conservation practices.

In Hawaii, possibly more than in any other State, most of the

testimony in hearings preceding adoption of the standards focused on the problem of sediment pollution. Agricultural industry representatives were probably the most consistent participants in the 17 hearings conducted throughout the State.

Sediment pollution is spectacularly apparent in Hawaii when entire coastal waters become tinged after storms with the reddish hue of the Islands' volcanic soils. Most of the high-clay soils are relatively stable in their natural state but are easily eroded when cultivated. Because most of Hawaii's agriculture is located on the slopes of the predominantly mountainous islands, cultivated fields are easily seen as the major source of sediment pollution.

Charles T. Bourns, chief of Federal Water Pollution Control Administration activities in the State, says, "The worst pollution comes



Hawaii's hotels, concentrated along the shore, are vulnerable to sediment (above) swept from mountainside fields. The heavy rains cause severe rill and gully erosion on sugarcane and pineapple fields (below) that are not protected by conservation measures.



from storm water runoff eroding Hawaii's topsoil—from all over the Islands.”

Not only the highly mechanized sugarcane and pineapple operations, but other earthwork activities are causing serious sediment problems. Building contracts, including development of subdivisions, industrial plants, and the necessary public works, have doubled in the past 10 years. In 1965, Honolulu ranked fifth nationally in the value of building contracts issued.

“Soil conservation is the principal program that can be applied to the control of sediments,” says Bourns. “The procedure to minimize pollution from this source is to be assured that farmers have active conservation programs which have been developed in cooperation with soil and water conservation districts.”

The standard will be implemented by requiring any person polluting waters of the State to abate the pollution within a specified time or be subject to fine or imprisonment, or both, upon conviction.

The city and county of Honolulu also recognizes that proper land treatment is the key to sediment control. For the past year, they have required subdivision developers to submit their plans to the Soil Conservation Service for review and recommendations as to means of curbing dust and erosion problems. Although such review is not required by city ordinance, the director of planning will not approve subdivision plans without SCS review. ♦

Know your soil

As an individual home buyer or builder, you may spend months checking and considering the design, materials, and construction of your new home. You should be equally concerned about the soil underneath. The soil you build on can seriously affect the stability of your home, your repair bills, your comfort, and the resale value of your property. ♦

Conservation districts pick streams for intensive cleanup campaign

By Thomas B. Evans

State conservationist, SCS, Indianapolis Ind. (formerly Morgantown W. Va.)

Three soil conservation districts in West Virginia have taken the initiative in a pilot effort to clean up polluted streams.

Supervisors of each district—the Elk, the Southern, and the Little Kanawha—have selected a stream within the boundaries of the district and set out to enlist the cooperation of public agencies and private interests to make it run crystal clear again.

Soil conservation districts, of course, do not have the authority or the capabilities within their own organization to do such a job alone. They are, however, in a favored position to focus the attention of responsible agencies and local individuals on the problem and coordinate their efforts.

The target streams

The three districts have wisely chosen to concentrate on small streams where there appeared to be reasonable opportunity for success. They are:

Big Ditch Creek in the Elk Soil Conservation District.

East River in the Southern Soil Conservation District.

Spring Creek in the Little Kanawha Soil Conservation District.

Supervisors of the Southern District hope to make the East River a year-round trout stream again. It used to be a natural trout stream, and there are still native trout in the upper reaches, although most of its length is now too badly polluted to support fish. Biologists from the State Department of Natural Resources and the Soil Conservation Service are jointly studying the problem.

Each of the three conservation districts is moving ahead in its own way, and all are getting definite action started toward cleaning up the selected streams.

They have made arrangements with the Federal Water Pollution Control Administration to study and report on existing conditions and what needs to be done. They have held meetings with the State Department of Natural Resources and State Department of Health, with such Federal agencies as the Farmers Home Administration, Office of Economic Development and Soil Conservation Service, and with various local interests.

Antipollution objectives

As the needs are pinpointed, each district will develop a plan of work to guide the cooperating organizations in carrying out their actions. The following is a combined list of their objectives:

(1) Building acceptable sewage disposal systems by several of the towns.

(2) Eliminating acid mine drainage from surface and deep mines in the affected watersheds.

(3) Installing basins at certain railroad yards to prevent diesel oil, detergents, and other industrial pollutants from entering the stream.

(4) Establishing a tertiary sewage effluent treatment plant for one of the cities concerned.

(5) Attacking pollution originating from filling stations, garages, and small industries located adjacent to the streams.

(6) Initiating a program for rebuilding private sanitation fa-

cilities that are contributing to the pollution of the streams.

(7) Eliminating siltation from unseeded roadbanks and other critical areas.

(8) Eliminating garbage disposal along the streambanks by a demonstration of sanitary landfill, under the provisions of the Solid Waste Disposal Act and the Appalachian Regional Development Act.

(9) Creating a single sanitary district for one of the watersheds, exclusive of the incorporated towns, or, as an alternative, establishing a separate sanitary district for each community.

In addition to the concentrated efforts in these three districts, all of West Virginia's soil conservation districts have executed Memorandums of Understanding with the State Department of Health for cooperation in the clean streams movement. Every one of the State's districts has updated its program and signed a revised Memorandum of Understanding with the Secretary of Agriculture and with a number of State departments and agencies.

The soil conservation districts of West Virginia are accepting the challenge to plan and develop the resources of the State for the future of the Nation. ♦

Districts self-governed

Each soil and water conservation district is legally responsible for soil and water conservation within its territory just as a county is responsible for roads or a school district for education. ♦

The Secretary looks and listens

Secretary of Agriculture Orville L. Freeman, on his four-State "look and listen" tour this summer, got a firsthand view of soil and water conservation developments ranging from individual farms having well-established conservation plans to a million-acre Resource Conservation and Development Project.

The tour to check effectiveness of Federal programs in meeting the needs of rural people, particularly those in the lower income bracket, included areas of Iowa, Mississippi, Alabama, and Indiana.

The Secretary discussed problems with rural people, local officials, and Federal personnel to find out what needs to be done to build modern self-sufficient communities in rural America.

He was accompanied by Mrs. Freeman and representatives of the Bureau of the Budget, Office of Economic Opportunity, and Departments of Housing and Urban Development and Health, Education, and Welfare.

Tour stops of special interest to resource conservationists included: —The Loren E. Eddy farm near Centerville, Iowa, where a conservation plan has substantially improved the farm's income potential.

—The Wayne L. Sample farm near Albia, Iowa, where SCS helped develop a recreation enterprise consisting of 80 campsites, picnic grounds, and water and sanitation facilities.

—The ARS Soil Sedimentation Laboratory and the SCS State Design Unit at Oxford, Miss.

—And the million-acre Lincoln Hills Resource Conservation and Development Project in southern Indiana, the first RC&D project approved by Secretary Freeman—in the operations stage for the past 3 years. ♦



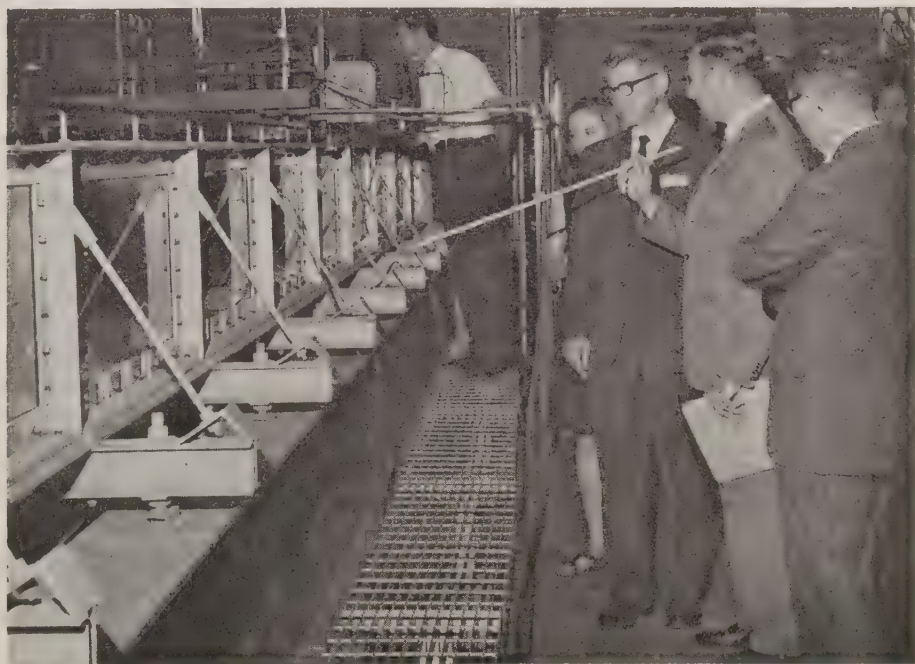
Above, Secretary Freeman, with the help of Job Corpsmen Thomas Frazier and Earl Blank, chairman of the Lincoln Hills RC&D Project executive committee, officially opened the Saddle Lake Recreation Area in the Hoosier National Forest to the public. Then he and his party toured the facilities, including the Middle Fork of Anderson River Watershed Project. At right, he is flanked by James List, director of the Branchville Job Corps Conservation Center (left) and Al G. Dauby, chairman of the RC&D Forestry Committee.

At Demopolis, Ala. (below), Mrs. Orville Freeman took part in a beautification program by planting an evergreen magnolia tree on the grounds of Bluff Hall, a historic mansion built in 1882, now being restored. At the Loren Eddy farm near Centerville, Iowa (lower, center), Angus cattle caught the attention of Secretary Freeman. Eddy took over the all-but-abandoned 460-acre tract in 1956 and built it into a successful farming enterprise. Through his conservation farm plan he has installed 3,800 feet of diversion terraces, a farm pond, and 10 acres of grassed waterways. Eddy is a cooperator in the Appanoose Soil Conservation District and co-chairman of the Appanoose Watershed Association.





Secretary Freeman and his party (above, right) watch particle-board being manufactured at the Storrs Wood Products plant at Evanston, Ind., which will employ about 475 people when in full production. A Lincoln Hills RC&D Project measure, the plant was financed in part by Area Redevelopment Administration and Rural Electrification Administration loans. Dr. Amson Bertrand, ARS (below), explains to Secretary Freeman the research work being carried on at the Soil Sedimentation Laboratory near Oxford, Miss. The Secretary also toured the SCS State Design Unit where the research findings are put to practical use.



Raising fish is Kansas farm business

COOPERATOR Conley Cleveland is converting cropland, northwest of Republic, Kans., to production of golden shiner minnows and catfish.

A sportsman by instinct and training, Cleveland picked his production sites carefully. He leased a farm that has a high bluff above the river bottom. On the bluff are seven springs having a year-round flow of 300 gallons a minute of pure water at a constant temperature of 56 degrees.

Cleveland and the farmowner, George Powell, are cooperators with the Republic County Soil Conservation District. The Soil Conservation Service helped Cleveland plan his fish production enterprise. The soil survey indicated the suitability of the site for ponds.

He has completed 30 ponds, covering a combined area of about 30 acres. The depth of water is maintained at 3 to 4 feet. Each pond has its own inlet, a separate outlet, and is fed direct by springs.

In the spring of 1966, 3 ponds were stocked with 30,000 golden shiners, and 2 ponds with 36 five-pound channel catfish for propagation.

Cleveland produces minnows for bait, both retail and wholesale, and supplies catfish for the local markets.

Cleveland hopes to convert one tract of land into a pond covering 10 acres. He hopes eventually to expand his operations so he could contract with other farmers to stock their farm ponds with catfish. He would furnish the feed, give instructions for care of the fish, and harvest them annually. He would then pay the farmers for usable fish and restock the pond for a crop the following year.

Last spring, Cleveland had about 10,000 fingerlings and about 10,000 golden shiners ready for stocking farmer-owned ponds. This summer, he had more than 3,000 cat-



Conley Cleveland and Fred C. Gleue, SCS work unit conservationist, measure waterflow and temperature as spring water enters fish ponds. Cleveland's fish ponds in the Republican River Valley are supplied with water from springs in the nearby bluff.



fish for public fishing.

His water temperature is suitable for trout. In July 1966, he stocked 8,000 trout, and the trout pond was opened in early April.

This kind of work is a drastic change from Conley's duties of a year ago, when he was a first lieutenant with the 77th Armored Fifth Infantry Division (mechanized) U. S. Army.—FRED C. GLEUE, *work unit conservationist*,

SCS, Belleville, Kans. ♦

Good shelterbelts

Properly designed shelterbelts slow down speed of the wind by splitting air currents. Part of the wind is diffused through the belt, and part of it is diverted over the top. This creates an island of relatively calm air near the ground on the downwind, or leeward, side of the shelterbelt.

The 1967 Watershed of the Year—the North Fork Little River Watershed in Kentucky's Christian County Soil and Water Conservation District—is an example of the way in which watershed citizens solve their problems of flood hazards and water shortage and add richly to the quality of their environment.

As usual, the winning watershed was announced at the National Watershed Congress, held this year in Boston in June. Any one of the 12 other projects in competition for the 1967 award would have been a creditable selection, according to James B. Craig, editor of *American Forests* magazine and chairman of the awards committee.

The Watershed Man of the Year, William F. Vaughan, faced equally close competition. He lives in his ancestral home in Charlotte County, Va., and presides as chairman over the five-county Southside Soil and Water Conservation District. His friends say he is known as "Mr. Watershed" in recognition of his leadership in behalf of the Roanoke Creek Watershed Project, one of the first activated under the Watershed Protection and Flood Prevention Act.

The flood that didn't come

In the North Fork Little River watershed, residents speak of March 3, 1964, as the time the floods did not come.

They are remembering an earlier day, in 1957, when torrential rains fell in the area. Floodwaters swept through the area's principal city, Hopkinsville, leaving disaster that was reckoned at \$610,000. At the intersection of Ninth and Main Streets, the water that day reached a depth of 4½ feet.

The rains in 1964 were as intense as at the time of the 1957 flood. But two of the proposed four floodwater-retarding structures were in place, receiving the runoff that would have meant repetition of the earlier damage.

Watershed project and man of the year exemplify multiple community services

There was no damage in 1964.

And a billion gallons of water went into storage for domestic use.

The four structures in the project plan are now complete. Their combined 500 acres of water surface offers recreation opportunity for thousands.

A water treasury

The abundant supply of water provides for the foreseen needs of the community well beyond the year 2000.

The new water treasury has brought four new industries to the watershed, and three others are expanding because of the water-supply guarantee.

Local participation and cooperation were a key to the project success, as is inevitably the case in such achievements. The Little River Conservancy District, a project sponsor along with the Chris-

tian County Soil and Water Conservation District and the city of Hopkinsville, had no need to exercise its right of taxation and eminent domain. Land rights valued at \$140,000 were secured from 65 landowners by the city. The city cost-shared more than \$300,000 of the cost of the structures assigned to benefits other than flood prevention.

Landowners working through the Christian County District, with technical assistance from the Soil Conservation Service, have completed needed land treatment on well over four-fifths of the watershed's agricultural land.

The Kentucky Department of Fish and Wildlife helped with the fish and wildlife development, contributing \$25,000. The U.S. Forest Service cooperated with the Kentucky Division of Forestry in the planting of 178,000 tree seedlings.

The Extension Service pushed

Lake Blythe, with an area of 90 acres when full, and its surroundings are being developed as a recreation area.



land treatment and helped with educational programs. The Agricultural Stabilization and Conservation Service helped with the planning and application work. The Army's Corps of Engineers provided hydrologic information and pooled their knowledge with SCS and local planners.

An area adjacent to Lake Blythe, one of the conservation and storage pools in the development, is being improved in the area's Youth Recreation Program. Girl Scouts have established a summer camp there.

During a period of drought last year, when a community not far away was forced to ration its water supply, the people of the North Fork Little River watershed were secure in their water abundance. Lake Boxley, from which the Hopkinsville water is taken directly, dropped only 26 inches during the long dry period.

New building, along the river, has taken a spurt since flooding is no longer a threat.

Man of long vision

The Watershed Man of the Year, Mr. Vaughan, whose farm is, according to conservationists, a splendid example of resource conservation, was one of the early believers in watershed planning for many uses and for long-range as well as the near-at-hand needs.

He pressed, in addition to flood prevention, for water for domestic supply and for industry, for supplemental irrigation, and for the development of the recreation potential in the area. He preached the value of land treatment and encouraged landowners to develop irrigation supplies as well as stockwater. There are 2,311 reservoirs holding irrigation water in the district and 1,879 farm ponds, nearly all stocked and managed for fish production.

Wetland preservation for wildlife has not been overlooked.

The entire area echoes a community's appreciation for work of Mr. Vaughan, wrote Mayor H. H.

Hanmer, Jr., of Keysville, "With Mr. Vaughan's help we cooperated with the Soil Conservation Service to increase the height of the dam (Dam 70A on Spring Creek) which gives us around 200 acre-feet of available water. We now have a filter plant with a million gallons a day capacity which gives us an abundant supply of water now and provides for future growth. Prior to this we were pumping 13 wells and suffering an acute water shortage which made it necessary to close down our local industry at times." ♦

Water pollution

(Continued from p. 30)

an example of this type of pollutant. Salts in the wastes from certain industries is another example.

Rivers in arid and semiarid regions may pick appreciable quantities of salt from the land from which they flow. The Colorado River at Yuma, Ariz., carries more than 1 ton of dissolved salt per acre-foot of water. Samples of the Pecos River water in Texas during low flows have indicated concentrations of more than 15 tons of dissolved salt per acre-foot of water.

Salinity is a major problem in the irrigation agriculture of the Southwest. Samples of drainage from these irrigated lands have been found to contain up to 25 tons of salt per acre-foot of water.

Acid mine drainage, especially in the Ohio River Basin, has serious adverse effects on water quality and may destroy aquatic life.

It is clear that if pesticides, animal wastes, infectious agents, phosphate, or silt move from the land to our streams and result in water pollution, runoff and sediment delivery are the major vehicles. If we are to effectively reduce pollution from agricultural sources, soil conservation practices must be applied much more thoroughly and effectively to watershed lands than they are today. ♦

Tree-planting project reclaims surface mine

Boy Scouts from the Tri-Valley Scouting District took on tree planting as a project in helping to reclaim an old unbonded surface mine in Mineral County near Hartsmansville, W. Va.

More than 100 boys participated and planted 10,000 trees. The Potomac Valley Soil Conservation District provided a "patch" designed and made for this one project for each Scout and adult leader participating to wear on his uniform. The patch combined the Boy Scout gold seal and the district's seal with a tree to represent the planting project.

Several organizations cooperated. SCS developed a plan for planting the area and provided some of the adult leaders; the Department of Natural Resources gave the Potomac Valley District money to buy the trees; the district got the Boy Scouts to do the planting as a project; and the National Guard Unit prepared the food. ♦

Highway beautified

The Liberty County Girl Scout Troop with the help of former Texas Governor Price Daniel planted redbud trees for beautification on his land along State Highway 1011 last spring.

The redbud seedlings were furnished by the Lower Trinity Soil and Water Conservation District of Texas. Mr. Daniel, a strong backer of districts, is a cooperator with the Lower Trinity District. He runs a 5,304-acre cattle ranch and maintains a deer preserve on his land.—L. N. NEUMEYER, *work unit conservationist, SCS, Liberty, Tex.* ♦

Soil surveys beneficial to many

More than 50 million acres are surveyed each year by the 1,200 soil scientists employed by USDA. These studies are valuable not only to farmers, but to industry, highway engineers, land appraisers, and urban developers. ♦

Get 400 Boy Scouts for tree planting and enlist the cooperation of the Izaak Walton League, the school district, and the soil conservation district, and the combination adds up to real accomplishment in beautification and conservation.

This was the experience in the Jefferson Soil Conservation District in Colorado where more than 4,000 trees were planted around 8 schools grounds and the county stadium 1 day in the spring of 1966.

The massive tree planting effort was the result of careful planning by Ken Fox of the Boy Scouts, Dale Jones of the Izaak Walton League, George McCormack of School District R-1, and specialists from the Soil Conservation Service.

Jefferson County, a growing suburban area west of Denver, has lots of kids, new homes, and new schools. School District R-1, with an annual budget of about \$30 million, is big business in the county. It has 65 schools on about 1,750 acres of land that has conservation problems. Rains cause erosion, wind creates dust, the new schools look barren and lack privacy from other buildings and traffic.

Boy Scouts plant trees for beautification of school grounds

School District R-1 applied to the Jefferson District for help in laying out tree plantings, grass seeding, diversion terraces, land leveling, and needed irrigation systems.

Tree planting for beautification was a major part of the plan—the Boy Scouts to supply labor and tools; the Izaak Walton League to furnish supervision; the school district to prepare the planting sites and supply the planting stock, watering facilities, and snow fencing for protection of the plantings. Planting stock was purchased from the Colorado State Forest Service Nursery at Fort Collins, Colo.

Specialists assisting the district drew up the plans and laid out the location for each tree, using a teaspoon of flour to mark the spot, since rain and wind don't destroy flour marks.

Every 3 boys had 1 adult supervisor, and 200 Boy Scouts worked in the morning and 200 fresh Scouts in the afternoon. Each group of 3 boys was given 30 trees

to plant. Each boy dug 10 holes and planted and watered 10 trees.

After planting trees the boys reported to a new nursery set up by the school district to finish out their day, and 15,000 additional trees were lined out to provide a source of large planting stock for future years of beautification.

Boy Scouts working on merit badges in forestry and conservation received certificates for their work.

A recent inspection shows that almost 100 percent of the trees are growing well; the few replacements needed will come from the new nursery.

In a few short years all the school grounds in Jefferson County will be transformed, and conservation beautification will have been served by cooperation of Federal and local governments, private organizations, and people.—ELLIS LUND AND W. S. SWENSON, *work unit conservationist and woodland conservationist, SCS, Golden and Denver, Colo.* ♦

Some fellows are willing to work (left) but the tools just don't fit their size. Everybody had a job as Boy Scouts planted 4,000 trees in 1 day.



Gravel pit becomes a beauty spot

A gravel pit need not be a lasting blemish on the land.

Hugh Byrd of Sharon, Mass., proved that, on the contrary, with a little planning and imagination, the land could be left usable and attractive after gravel is removed for use and sale.

As a cooperator with the Norfolk Conservation District, Byrd had the help of the Soil Conservation Service in making a plan for the area before excavation began. He hired private surveyors to set the grades for him, then he checked on the contractors during the digging to be sure they excavated only to the depths specified.

"Before we started," Mr. Byrd said, "the land was so steep and irregular a goat couldn't get around on it—and now look at it." And looking at it now is easy on the eyes. The broad, gently sloping, grassed areas, dotted with native trees and shrubs, make it hard to believe what it used to be like.

"With the historic remains of the Boston-Providence Stage Coach Road running along one side of the area and the new Interstate 95 being put through on the other side, we wanted the public to have something attractive to look at."

After excavation was completed, he applied lime and fertilizer and seeded the area to grass. The Norfolk County Extension Service developed plans for landscaping the area with plant materials so as to give it a final touch of good looks. Large specimens of native trees and shrubs were transplanted so the site would eventually blend with the rest of the countryside.

People driving along Interstate 95 or walking along the Old Stage Coach Road will never know what the area might have looked like without Mr. Byrd's forethought—but they can be pleased with what they see because of it.—HENRY J. RITZER, *work unit conservationist, SCS, Walpole, Mass.* ♦



Scarred landscape, covered with ugly boulders (top), shows results of removal of gravel where no conservation measures have been taken to restore area. Another area (center) with possibilities for water-based recreation is an eyesore before conservation practices begin. Parklike effect (below) achieved by Hugh Byrd shows that gravel removal need not leave ugly scars.



Appalachian area farmers get special help

Low-income farmers in the McMinn County Soil Conservation District in Tennessee are making economic gains with stepped up assistance in conservation work following the designation of McMinn County under the Appalachia Regional Development Act of 1965.

To help with the acceleration of services to landowners in the district, SCS employed a local farmer, Warren D. Roseman, as a part-time conservation aide. Through his acquaintance with the people, and with the voluntary help of W. E. Nash, retired principal of Cook High School, Roseman was able to bring assistance to many farmers not reached before.

Since the district speeded up its program, SCS conservationists have helped all Negro farmers in McMinn County complete conservation plans for their land. Nineteen farm ponds have been built for livestock water, and 15 have been stocked with fish. Soil samples have been tested and fertilizer applied to crops on 24 farms. Several farmers are converting land to pasture.

One farmer is enlarging his dairy operation and building a new milking parlor. A community group is drawing up plans for a small slaughtering plant, a molasses sirup mill, and a community fence post treating plant.

Three elderly landowners have started raising rabbits and producing worms for fishing to increase their income.

The Piney Community has used \$1,200 for a new well and water system for the church.

Two wells are providing some families with running water for the first time in their lives.

We and Area Conservationist Warren Corbett are quick to give credit to Roseman. When asked what he considered to be the most important thing to remember when



Warren Roseman (right), soil conservation aide, looks on as Mrs. Frank Moore pours her son, Robert, a glass of water taken from a new well made possible by an FHA loan.

working with disadvantaged farmers, Roseman replied:

"Discuss only one problem at a time. And, try to make that the one thing he is most interested in doing something about. After a problem and the solution are well understood, and plans are developed to solve it, you can move on to other items needing attention."

Other agencies have pitched in to help with the increased aid to disadvantaged landowners in McMinn County.

The county agricultural agent has held group meetings and provided other educational assistance. The County Agricultural Stabilization and Conservation Service has provided cost-share assistance on ponds and other practices. Farmers Home Administration made loans for installation of both wells.

Under the leadership of Rex Moses, chairman of the conservation district board and director of McMinn County Economic Devel-

opment Office, adult education also is being provided to low-income people. A home and community beautification program is planned. A roadside market is planned in one community to help increase incomes.

Roseman's assistance contributes greatly to these groups in helping to open the doors and minds of low-income farmers to the opportunities of increasing their incomes through resource development and conservation activities.—OBIE L. MASINGALE AND ELMER E. JONES, *assistant to State soil conservationist, SCS, Nashville, and work unit conservationist, SCS, Athens, Tenn.* ♦

Land resources interdependent

The several land resources—soil, water, plants, and animals—cannot be effectively used or managed separately. They are completely interdependent, and hence the land must be dealt with as a whole, acre by acre and unit by unit. ♦

Conservation work wins Hornaday Scout Award

A succession of conservation activities on the council campground and on a variety of other public areas in Massachusetts brought Boy Scout Troop 149 of Oxford the William T. Hornaday Award for distinguished service in conservation.

The award, presented by the Boy Scouts of America in cooperation with the New York Zoological Society, is reserved for a very few individual Scouts and Scout units that demonstrate exceptional accomplishment in conservation.

In 1965 and 1966, Troop 149 planted red pines, pruned and thinned existing stands, cleared fire trails and drainage ditches, treated gullies, and did other conservation chores while in camp at the Mohegan Council's Treasure Valley Training Reservation. The work was a part of the overall conservation plan for the 850-acre camp developed in cooperation with the Southern Worcester County Conservation District.

During the 2-year period 1965-66, the troop did similar chores in the Oxford town forest, at Hillcrest Farms in Auburn, at the Hodges Village dam and recreation area near Oxford, and at Camp Clara Barton, a summer youth camp for diabetic girls near North Oxford.—AUGUST I. REESE, *formerly work unit conservationist, SCS, and Scoutmaster of Troop 149, Oxford, Mass.* ♦

Low aerial photo flights reduce engineering costs

The Soil Conservation Service in Delaware is using aerial photography to reduce engineering survey work in woodlands in watershed project planning.

A new low level photo flight has been made on a small subwatershed to determine whether old drainage ditches and stream channels will show up through the trees. Where

successful, the photos will make for fewer surveys for channel alignment and more effective use of the stereoscope for flood-plain delineation.

Delaware law permits the use of aerial photos for drainage-ditch land rights acquisition, provided the new channel location can be shown in relation to the present channel. Thus the same photos that reduce engineering survey costs will expedite land rights acquisition as well. ♦

Remote sensing of plants, animals, soils

Under a \$246,000 contract let by USDA, scientists at Purdue University, Lafayette, Ind., plan to study ways to identify vegetation, animals, and soils by remote sensing equipment in satellites.

The study, sponsored by the Agricultural Research Service, is aimed at designing ways to correlate information gathered by remote sensing equipment for use in agricultural resource surveys.

Agricultural surveys by satellites equipped with optical and electronic sensors could, among other things, identify the world's agricultural resources and help underdeveloped countries in stepping up lagging food production and in developing natural resources.

Robert B. MacDonald is project leader for Purdue, and Dr. A. B. Park is technical representative for ARS. ♦

Help for pollution control

A Federal grant under Green-span Program provides Sioux Falls, S. Dak., \$19,932 to help buy 119 acres of cropland for expansion of its well field to prevent pollution of its water supply and provide sites for future wells.

Total cost of the cropland in the 160-acre farm is \$39,865. The sum of \$484 in cost-share assistance is also authorized to aid in establishing the conservation measures the land will need in its new use. ♦

Translations of research reports

Scientists in the Soil Conservation Service are helped to keep abreast of developments in their special fields by translations of foreign reports made under the Special Foreign Currency Science Information (SFCSI) Program administered by the National Science Foundation.

In the last 6 years, USDA has received nearly 800 translated articles in the earth and biological sciences. They are paid for by foreign currencies that accrue to the credit of the United States Government from the sale of surplus agricultural commodities.

Most translations have been of Russian literature, and the work was done in Israel. Some Polish and Yugoslavian articles have been translated and were done in Poland and Yugoslavia.

In 1967, translations from other European languages and from Arabic are to be started in Algeria, United Arab Republic, and India.

These translations include some important publications in soil science. Among the classics are Glinka's book, *A Treatise on Soil Science*; Dokuchaev's, *The Russian Chernozem*; and Gedroit's work on cation exchange reactions and their relationships to soil formation and behavior. The outstanding recent book in classification and genesis is *Soil Science* by Rode. These and other publications on soil and water conservation are listed below.

These translations, plus the cover-to-cover translation of *Pochvo-vedeniye*, the principal Russian soil periodical, into the English Journal, *Soviet Soil Science*, have enabled United States soil scientists, agronomists, and conservationists to obtain a better understanding of soil science and agronomy in the U. S. S. R. and other countries.

Most Land-Grant College libraries have copies of the translations.

Free distribution of those listed below has been made to SCS supervisory soil scientists and conservationists in each State.

Many of the publications are now available for purchase from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151. The "TT" number shown in the list of translations should be used in ordering a publication. The charge is \$3 for each translation regardless of the number of pages.

The Soil Science Society of America now sponsors the *Soviet Soil Science*, 677 South Segoe Road, Madison, Wis. 53711. Copies are offered to a member of the Society at \$9 a year where the library of the institution for which he works is a current subscriber to *Soviet Soil Science*.—ANTON J. VESSEL, *soil scientist, SCS, Hyattsville, Md.*

Soil genesis and classification

Treatise on Soil Science. BY K. D. GLINKA. (1931) 1963. 674 pp. Russian. TT 61-31002.

The Place and Role of Contemporary Soil Science in Science and Life. BY V. V. DOKUCHAEV. (1949) 1966. 9 pp. Russian. TT 66-51117.

Russian Steppes in the Past and in the Present. BY V. V. DOKUCHAEV. (1964) 1967. 67 pp. Russian. TT 66-51118.

Study of the Zones of Nature. BY V. V. DOKUCHAEV. (1949) 1966. Russian. 13 pp. TT 66-51119.

The Russian Chernozem (Selected Works.) BY V. V. DOKUCHAEV. (1948) 1967. 419 pp. Russian. TT 66-51133.

Genetic Soil Classification Based on the Absorptive Soil Complex and Absorbed Soil Cations. BY K. K. GEDROITS. (1927) 1966. 70 pp. Russian. TT 66-51135/1.

Selected Articles. BY K. K. GEDROITS. (1921-23, 1955) 1966. 75 pp. Russian. TT 66-51135/2.

Short Course in Soil Science. BY P. A. KOSSOVICH. (1916) 1967. Russian. TT 67-51279.

Soil Science, Vol. 1 of Selected Works. BY N. M. SIBIRTSEV. (1951) 1966. 354 pp. Russian. TT 65-50126.

Soil Science and Drought Control, Vol. 2 of Selected Works. BY N. M. SIBIRTSEV. (1953) 1966. 392 pp. Russian. TT 66-51136.

A Tentative Classification of Soil-Forming Processes as Related to Soil Genesis. BY S. S. NEUSTRUEV. (1926) 1967. 47 pp. Russian. TT 67-51280.

Concerning the Origin and Evolution of Chernozem Soils. BY E. A. AFANAS'eva. (1946) 1960. 8 pp. Russian. TT 60-21846.

The Solonetz Soils. BY V. A. KOVDA. (1939) 1961. 58 pp. Russian. TT 60-21853.

Soil Science. BY A. A. RODE. (1955) 1962. 517 pp. Russian. TT 61-31000.

Loess as a Product of Weathering and Soil Formation. BY L. S. BERG. (1960) 1964. 207 pp. Russian. TT 64-11075.

Mineralogical Investigations in Soil Science. BY E. I. PARFEINOVA. (1962) 1965. 184 pp. Russian. TT 65-50069.

Soil Science, 6th Edition. BY V. R. VIL'YAMS. (1949) 1967. Russian. TT 67-51283.

The Transformation of Clay Minerals in Sedimentation. The Study of Triassic Clays. BY J. LUCAS. (1962) 1967. French. TT 67-51288.

Soil investigations and procedures

Chemical Analysis of Soils. BY K. K. GEDROITS. (1955) 1963. 602 pp. Russian. TT 63-11079.

Practical Soil Science. BY N. N. NIKOL'SKII. (1959) 1963. 240 pp. Russian. TT 63-11083.

Ameliorative Pedology. BY S. V. ASTAPOV. (1958) 1964. 272 pp. Russian. TT 64-11013.

Soil Survey: A Guide to Field Investigations and Mapping of Soils. EDITED BY I. V. TYURIN (ET AL). (1959) 1965. 364 pp. Russian. TT 65-50062.

Mechanical and Microaggregate Composition of Soils, Methods of Investigation. BY N. A. KACHINSKII. (1958) 1966. 134 pp. Russian. TT 66-51123.

Guide Book for Determining the Lithologic Composition of Surface Deposits and Depth of Occurrence of Ground Waters. EDITED BY N. G. VEREISKII AND E. A. VOSTOKOVA. (1963) 1966. 247 pp. Russian. TT 66-51134.

Reclamation of Solonetz Soils of the USSR. EDITED BY I. V. TYURIN (ET AL). (1953) 1967. Russian. TT 67-51281.

Soil physics and engineering

Principles of Engineering Calculations for Loess Soils Deformation Under Irrigation Installations. BY A. I. RUBENSHTEIN. (1958) 1960. 11 pp. Russian. TT 60-21195.

Fundamentals of Agrophysics. BY P. F. VERESHININ (ET AL). (1959) 1966. 726 pp. Russian. TT 65-50079.

Soils geography

The Soils of Southern Siberia (From the Urals to the Baikal). BY K. P. GORSHENIN. (1955) 1961. 758 pp. map in pocket. Russian. TT 60-21833.

The Serozems of Central Asia. BY A. N. ROZANOV. (1951) 1961. 541 pp. Russian. TT 60-21834.

Fundamentals of Soil Science and Soil Geography. BY I. P. GERASIMOV AND M. A. GLAZOVSKAYA. (1960) 1965. 382 pp. Russian. TT 65-50061.

Soils of the Desert Zone of the USSR. BY E. V. LOBOVA. (1960) 1967. Russian. TT 67-51279.

Soil and water conservation

Effect of Shelterbelts on the Soil of the Interstrip Area. BY A. S. BAIKO. (1955) 1960. 10 pp. Russian. TT 60-21896.

Fixation of Sands by Means of Bituminous Emulsion. BY N. N. BANASEVICH AND N. G. ZAKHAROV. (1940) 1960. 5 pp. Russian. TT 60-21870.

The Hydrological Role of Shelterbelts on the Kamennaya Steppe. BY G. S. BASOV. (1949) 1960. 20 pp. Russian. TT 60-21871.

Soil Changes Under Shelterbelts in the Conditions of the Caspian Lowland. BY A. P. BIRYUKOVA. (1955) 1960. 9 pp. Russian. TT 60-21872.

The Influence of Forest Belts on the Turbulent Exchange and the Optimal Width of the Belts. BY M. I. YUDIN. (1950) 1961. 4 pp. Russian. TT 60-21834.

Shelterbelt, Kamyshin to Stalingrad. BY A. GRACHEV. (1957) 1960. 76 pp. Russian. TT 60-51079.

Principles of Field-Protective Forestation. BY B. I. LOGGINOV. (1961) 1964. 302 pp. Russian. TT 64-11010.

The Temperature Regime of Soils. BY A. M. SHULGIN. (1957) 1965. 218 pp. Russian. TT 65-50083.

Soil Moisture and Its Significance in Agriculture. BY S. A. VERIGO AND L. A. RAZUMOVA. (1963) 1966. 234 pp. Russian. TT 66-51107.

Welfare of downstream owners studied

The welfare of "the fellow downstream" is being studied in a huge watershed research project on the Washita River Basin of Oklahoma.

Because of growing interest in water conservation, many detention reservoirs, dams, and other water-control structures are being built in the Nation's major river bottoms. To find out if these structures threaten the water supplies of people further down the river, William O. Ree, hydraulic engineer, and his associates of the Agricultural Research Service of USDA installed an elaborate network of stream gages, rain gages, and sediment samplers on an 80-mile segment of the Washita River.

Findings to date indicate that, although the frequency of flood peaks has been lowered since the installation of detention reservoirs, the river still carries about the same amount of water during the year. ♦



Fieldbook. 2d. ed. 1967. *Boy Scouts of America, New Brunswick, N. J.* 565 pp., illus. \$1.95.

This fieldbook "for Boy Scouts, Explorers, Scouters, educators, outdoorsmen," is a lively companion for the official Boy Scout *Handbook*. It contains many how-to-do-it hints and bits of information that will help Scouts carry out the activities prescribed in the *Handbook* and help adult leaders and counsellors guide Scouts along the way.

The book is scarcely complete enough on any point to be a satisfactory reference for the person who needs explicit information. Its greatest value would seem to be in stimulating boys and men to try a wide range of outdoor activities which inevitably would lead them into learning situations. Even experienced outdoorsmen will find many useful facts and suggestions in this fascinating potpourri.—B.O.

New publications

Growing Loblolly and Shortleaf Pine in the Midsouth. BY CHARLES X. GRANO. Rev. 1967. *USDA Farmers' Bul.* 2102. 27 pp., illus. Information applies to loblolly and shortleaf pine lands in Arkansas, Oklahoma, Texas, Louisiana, Mississippi, Tennessee, and Alabama.

Lighting for Outdoor Recreation. 1967. U.S. Dept. Com., Business and Defense Services Administration. 26 pp., illus. \$0.25. Discussion of the extension of lighting facilities to existing recreational areas to make the best use of land in metropolitan areas, where it is at a premium; provide recreational facilities when and where working people are free to use them; and to reduce the cost of existing facilities per participant.

Municipal Watershed Management Symposium. Proceedings. EDITED BY JOHN H. NOYES AND DONALD L. MADER (1967) *Univ. Mass., Coop. Ext. Serv. Publ.* 446; *Planning and Resource Development Series 4.* Amherst. 84 pp., illus.

"This symposium (held in 1965) attempts to bring together research and management information in three principal areas of concern to municipal watershed administrators having forest land management program responsibilities: (1) the role of the forest in quantity of water produced, (2) the effect of the forest on quality of water produced, and (3) the need for establishing forest land-use policy on both public and private municipal watersheds."

The Food We Eat. 1967. *USDA Misc. Publ.* 870. 15 pp. \$0.10. The story of the American farmer and food production in simple terms.

Rare and Endangered Fish and Wildlife of the United States. COMPILED BY COMMITTEE ON RARE AND ENDANGERED WILDLIFE SPECIES. 1966. *U.S. Dept. Int. Bur. Sport Fisheries and Wildlife, Resources Publ.* 34. Loose-leaf. A separate page describes the status of each species.

Trails for America. BY BUREAU OF OUTDOOR RECREATION. 1966. *U. S. Dept. Int.* 155 pp., illus. \$2.25. The report of a nationwide study made in response to the President's message on Natural Beauty in which he called for development of a system of trails for

hiking, bicycling, and horseback riding. A system of cross-country trails along historic routes, supplemented by regional and metropolitan trails of scenic or historic values, is recommended.

Services Offered by the National Agricultural Library. COMPILED BY ROBERT B. POLEND. 1966. 11 pp.

Soil surveys

Parke County, Indiana. BY H. P. ULRICH, A. L. ZACHERY, T. E. BARNES, P. T. VEALE, GLENN H. ROBINSON, A. P. BELL, JOHN COMBES, S. D. ALFRED, AND FRANK SANDERS. 1967. 95 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Montgomery County, Pennsylvania. BY ROBERT V. SMITH. 187 pp., illus.; maps 4 inches to the mile (1:15,840). Field survey by Robert V. Smith, Jack S. Levitan, Lester L. Seglin, Edward A. Tompkins, and John Zarichansky.

Kinney County, Texas. BY ALLEN L. NEWMAN, JACK W. STEVENS, TOMMIE J. HOLDER, AND DANIEL ARRIAGA. 1967. 60 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Adams County, Pennsylvania. BY REGINALD SPEIR. 1967. 150 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Reginald Speir, Robert G. Grubb, Richard S. Long, Donald C. Leer, John F. Meier, Richard Weaver, Max Coy, and Reginald P. Partenheimer.

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From the Administrator:

Clean Water from Farmland



Soil and water conservation practices are as important in assuring a clean and pure water supply as they are in preserving and improving soil resources.

Since a major part of domestic, municipal, and industrial water supplies originate as runoff from farm and forest land, the conservation measures and land-management practices that affect the movement of water over and through the soil are a major factor in water quality.

They are of especial significance at this time in relation to the water-quality standards that every State is now required to establish in response to the Water Quality Act of 1965.

Sediment pollution is one of the most serious problems of water quality. Recent estimates indicate that erosional debris accounts for a much larger part of the total burden of solids in the Nation's streams than do municipal and industrial sewage discharges.

Soil conservation practices obviously are the first measures of defense against sediment pollution. In many quarters, erosion control is considered more important as a means of protecting water supplies than for protecting soil resources. Good progress is being made in reduction of sediment from farmlands, but effective means are still needed to deal with critical erosion areas beyond the control of the individual landowner.

Lately new concerns have arisen over the quality of water coming from farmlands. Questions are being raised with growing frequency about the possibility of contamination by animal wastes from grazing lands and barnyards,

the buildup of chemical residues from fertilizers and pesticides so necessary to efficient agricultural production, and the accumulation of organic wastes from the processing of food and fiber products.

These are valid questions and need to be faced squarely. They are a proper concern of soil conservationists who have a professional responsibility of helping land users manage their resources to achieve conservation objectives and create a wholesome environment for living.

The lead article in this magazine summarizes the facts as they are now understood about some of the principal sources of agricultural pollution of water supplies. As the article points out, the facts are not always as alarming as some of the fears that may be current.

But agricultural wastes, like those of any other human activity, do involve hazards to water quality if allowed to reach sources of supply.

Two principal courses of action appear open to safeguard against agricultural pollution of water supplies. One is to reduce, where possible, the quantity of contaminants produced or released. The other is to prevent these materials from reaching the water supply.

Soil conservationists can be helpful especially with the second phase of pollution abatement—the disposal and control of materials that must be released on the land. The Soil Conservation Service has had some experience in helping to plan irrigation systems to dispose of effluents from processing plants and sewage treatment systems. It has also been

consulted in the design of sewage lagoons for animal wastes. The potentialities of these systems have scarcely begun to be explored, and the technologies of soil and water management are basic to their design and installation.

Besides such concentrated sources of pollutants as feed yards and processing plants, there is the problem of fertilizers and other chemicals, and of manure from grazing animals, that are dispersed widely over the land surface.

Soil conservation practices that minimize surface runoff of water are the best possible protection against such dispersed contaminants. It is in the overland flow that such materials reach streams and lakes from which water supplies are drawn. Complete conservation treatment of a watershed reduces surface runoff, causing much of the water to be absorbed into the soil before it reaches stream channels as base flow.

The soil, then, serves as a mammoth filter and purification system in which organic materials are oxidized and complex chemicals are broken down into simpler substances. Plant nutrients, especially nitrogen and phosphorus that stimulate unwanted algae growths in water, are held in the soil where they add to productivity for crops, pastures, or woodlands.

Adequate soil and water conservation treatment of all agricultural land, therefore, takes on new urgency as a major safeguard to water quality for the Nation. Conservation methods, no doubt, can be further refined to serve this objective, as they have been adapted to other changing purposes of land use in the past.

The technology of land and water use—the special field of proficiency of the soil conservationist—can serve our growing concern for the quality of our environment. We *can* have clean water from agricultural land.

D. A. WILLIAMS



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Winning watershed provides recreation

Story on page 39



The four lakes in the 1967 Watershed of the Year, North Fork Little River watershed of Kentucky, are providing an estimated 3,000 man-days a year of recreation, and use is increasing rapidly.

Fishing is available at all four lakes and boating at three of them.

The city of Hopkinsville has added a caretaker's home, sanitary facilities, and developed a picnic and camping area with tables and grills at Lake Blythe.

An area below the dam has been made available to the Cumberland River Girl Scout Council for a day camp. The council is negotiating for additional land adjoining the lake for a permanent Girl Scout camp. ♦

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OCTOBER 1967

Vol. 33 No. 3

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



CONSERVATION EQUIPMENT

Industry cooperation

Farm examples

A river authority acts

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Special grass drills, designed to handle unusual seeds with precision, are used to seed native grasses on land retired from cultivation.

Tools for the job . . .

Conservation brings new problems to farmers. One of the most persistent is that new kinds of tools are needed to perform the new kinds of operations required to control runoff and protect soil.

SCS Conservationist G. E. (Jerry) Ryerson joins with Industrialist D. A. McAllister in recording (p. 57), we believe for the first time, the history of cooperation of the equipment and contracting industries with conservation districts, farmers, and conservationists in meeting this problem.

As an equipment engineer, Jerry for many years shared liberal portions of American ingenuity with other conservationists, farmers, and designers in adapting old, and devising new equipment for new jobs.

Action: Conservation needs not only new tools of iron and steel, but also new forms of human institutions to achieve community objectives. Information Specialist Dale Allen reports as an example from Texas (p. 51) how SARA, the San Antonio River Basin Authority, makes watershed programs work.

Teaching: Conservationists who give of their professional time in classrooms commonly feel the hopelessness of the size of the teaching job to be done, important as it is.

WUC Frederick Bubb and supervisors of the Lehigh County District in Pennsylvania found the the answer (p. 62) in a plan for teaching the teachers, rather than the pupils.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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A local river authority, created by the State Legislature, keeps small watershed projects moving in the sprawling San Antonio River Basin of Texas and sees that water-control installations are maintained in first-class condition after completion.

SARA, as the San Antonio River Authority is called locally, has 26 floodwater-retarding dams under its care; two more are under construction.

SARA has spent \$130,000 to speed up the planning of six watershed projects; two more are being planned and others will follow. Every project underway in the basin has been planned at least partly with local funds.

Construction has been completed in three SARA-sponsored watershed projects and is underway in another.

The authority was created in 1937 by the Texas Legislature. Its objectives were to seek a barge canal from the Gulf of Mexico to San Antonio and to promote flood control and soil conservation.

The authority has been interested in watershed projects since the

SARA, you're a good sponsor...

River authority builds watershed success in Texas

1940's. It provided money in 1951 for watershed planning by the Soil Conservation Service before the pilot watershed projects were authorized.

SARA helped organize soil and water conservation districts so all land in its basin would be eligible for the conservation assistance districts can provide. The authority works in cooperation with the Soil Conservation Service; the Hondo Creek Watershed Improvement District; and the Alamo, Wilson County, and Karnes-Goliad soil and water conservation districts.

The authority co-sponsored two of the first pilot watershed projects completed in the country, Escondido and Calaveras creeks. The model watersheds have helped sell thou-

sands of people on watershed work.

In a 1961 reorganization, SARA's responsibilities were expanded to include pollution control, recreation developments, and irrigation. A 12-member board of directors, assisted by a manager, operates the authority.

SARA maintains completed dams. It acquires land rights, administers contracts, and establishes vegetation on new floodwater-retarding dams.

One of the things that makes SARA unique is the way it maintains the grass cover on dams in the basin.

The authority has two maintenance field units, each of which has tractors, mowers, weed sprayers, fertilizer drills, and irrigation

Espada dam, built by Franciscan Friars in 1731 to take irrigation water out of the San Antonio River, was restored by SARA working with the San Antonio Conservation Society. The acequia, visible just to the left of the tree in the center, carries water 5 miles downstream to an old mission.





Dense bermudagrass on the dam on Martinez Creek is typical of the cover SARA maintains on its floodwater-retarding structures. Con Mims (left), SARA special projects coordinator, and Billy Griffin, SCS work unit conservationist, with other officials decide each year what work is needed to maintain them in good condition.

equipment. These units also will operate and maintain public parks SARA is building on land bought to help clear easements.

When all projects are completed, five maintenance units will be set up to care for the watershed protection projects.

SCS Work Unit Conservationists Billy Griffin of San Antonio and Roy Freeman of Kenedy help the authority plan work to be done on

every dam each year. They meet annually with SARA's Operations and Maintenance Division and appropriate conservation district supervisors. Decisions are reached as to which dams need fertilizer, irrigation, weed control, spot planting, or other measures. SARA then does the work.

SARA even grows its own bermudagrass sprigs for maintaining the dams.

Part of SARA's success in watershed projects and other conservation activities is due to the way it keeps the public informed. The authority publishes a conservation newsletter and holds public workshops to discuss watershed progress and needs. It also gives certificates of appreciation at public occasions to landowners who grant easements for floodwater-retarding structures.

The authority's work also includes conserving natural beauty and historical landmarks. A dam and acequia (irrigation supply ditch), installed by Franciscan Friars on the San Antonio River in 1731, was in danger of being bypassed and dried up by a channel improvement project on the river. Through the efforts of SARA and the San Antonio Conservation Society, flow to the dam and acequia was maintained. They were preserved intact, then restored and beautified.

By being concerned with all the land in its river basin, and emphasizing soil and water conservation in all its aspects, SARA is benefiting the entire San Antonio River basin. ♦

SARA cooperates with the State Highway Department by providing topsoil from the excavation above a floodwater-retarding dam to be used to help establish grass on slope cuts on a nearby freeway.



Pacific Northwest and Great Plains wheat growers may benefit from the ingenuity of three cooperators of the Adams Soil and Water Conservation District in Washington who improved their stubble-mulching programs with simple equipment modifications.

The changes are typical of the many adaptations that conservation farmers are constantly making to get more effective conservation results from farm implements. The three contributions from the Adams District are:

(1) Addition of a plate to the conventional chisel for stubble-mulch plowing, by Don Schwisow.

(2) Conversion of a rotary hoe into a rotary mulcher, by Dick Telecky.

(3) Plugging the holes in skew treader wheels to keep them from filling with straw, by Joe A. Huddle.

Chiseling is a common form of plowing to leave wheat stubble on the surface for soil protection. Chiseling in the fall retards germinated weeds, such as cheatgrass,

Wheat farmers improve equipment for more effective stubble mulching

By Hans A. Krauss

Work unit conservationist, SCS, Warden, Wash.

and opens the compacted soil to permit better penetration of rainfall. Chiseling should be done across the slope and as near the contour as possible.

Chisel and plate

Cooperator Schwisow adds a plate to each chisel on his plow to increase the stirring and roughening of the soil. The plates leave most of the stubble on the surface, Schwisow says, and leave the soil more open than standard chisels. He tells how to make the plates:

From a piece of 3/16-inch steel, cut pieces 7½ inches long by 6 inches wide. Taper the sides to the width of the shank at the bottom. Drill two holes to fit the two bolts

that hold the chisel point on the shank.

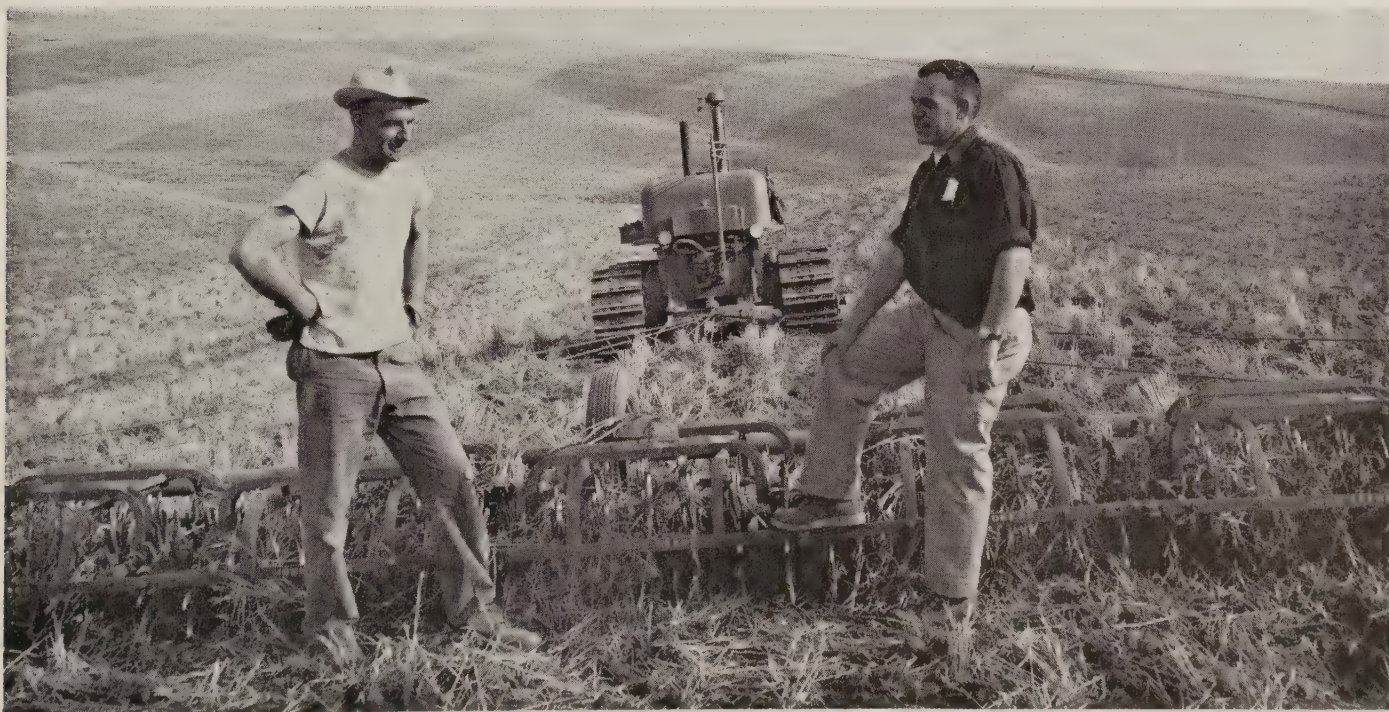
The top part of the plate should run slightly below the surface of the soil when the chisel penetrates about 10 inches.

Rotary mulcher

Dick Telecky, Schwisow's neighbor, has modified a rotary hoe to keep it from being plugged up with straw and uses it as a rotary mulcher.

He took a section of a rotary hoe that has two rows of seven spiders (toothed wheels) and reversed the end spiders of the back row so that the fingers point away from the direction of travel. All the other wheels were left in their normal

Dick Telecky (left) discusses his rotary mulcher, a modified rotary hoe, with former SCS Conservationist Larry Thola. The stubble on the right has been worked with the mulcher.





Stubble-mulching plate (above) added to conventional chisel by Don Schwisow tapers from 6 inches wide at top to width of shank at bottom. Joe A. Huddle (right) shows how he plugs the holes in skew treader wheels to keep them from catching straw. A piece of cheesecloth on the ground beneath the wheel serves as a form to hold the mixture of cement and metallic grouting aggregate.



positions, with the teeth pointing in the direction of travel.

The center spider and both end spiders of each row are made fast to the center shaft with a $\frac{1}{4}$ -inch machine bolt through each hub and shaft. These six pinned spiders act as drive wheels and clear the machine of straw.

Telecky combines 16 sections into a mulcher 56 feet wide. He uses a 3-inch diameter pipe supported on five rubber mounted wheels for a hitch. For proper handling, the cables are adjusted so that the distance between the tractor and the hitch is half the width of the implement (28 feet for the 56-foot-wide mulcher). Weights can be added if desired.

25 acres an hour

The 56-foot-wide mulcher covers more ground than most stubble tools; it easily completes 25 acres an hour. It also scatters straw better than the skew treader.

The flexible implement works well in draws, or "coulees." Eroded hillsides benefit because of its tendency to carry straw from the draws to the sidehills. Several extra trips can be made through the draws to break down the heavy stubble and transport it to the hillsides without overworking the soil. The rotary mulcher will not tear up a heavy, well-established sod nor will it do well in rocky ground.

In hilly terrain, an HD-9 or DC-6 tractor is needed to power the wide implement. In level fields, a smaller tractor will do. The number of sections can be reduced if tractor power is limited.

Improved skew treader

Joe A. Huddle of Washtucna has a simple method of altering the spoke-wheel skew treader so

the wheels will not plug up with straw. He fills the openings in the wheels with ferrolith G nonshrink metallic grouting aggregate mixed with cement.

To make a form, he simply lays a piece of cheesecloth on the ground and places the wheel on it with the hub extending through a hole and pressed slightly into the soil. He fills the openings with the mixture, smooths it with a trowel, and lets it harden, forming a solid wheel that does not catch straw.

The 18-pound wheel weighs about 24 pounds after this treatment. With 18 in a section and 10 sections, the additional weight is 1,080 pounds to the gang.

These three innovations by co-operators of the Adams District may help in applying better stubble-mulch programs. ♦

The "biggest lawn in Springfield Township" used to be under water 3 to 4 months at a time. The only crops that could be grown there were soybeans, corn, and poor-quality hay; even they drowned out in wet years.

Now people slow down when passing the Mercer Sod Farm to see the transformation that has taken place. Residents of the area say that "all Burlington County should look more like that."

The Mercer Sod Farm of 475 acres is operated by the four Cacavio brothers, Dominick, James, Frank, and Victor. As cooperators with the Burlington County Soil Conservation District, they had the assistance of SCS conservationists in designing a system of ditches to get rid of water that stood in surface depressions and in planning a sod-production program with maximum safeguards for soil resources.

Mercer Sod specializes in growing mixtures of Kentucky bluegrass and Merion bluegrass. The farm has provided sod for the West Point Military Academy, Convention Hall in Atlantic City, Trenton Cultural Center, Princeton University, Yankee Stadium, Princeton Day School, Roosevelt Stadium in Jersey City, Military Park in Newark, the New York Park Department, and numerous golf courses throughout the State.

The farm is laid out in a network of well-graded roads so that heavy equipment can get close to each sod-cutting site, and loaded trucks can leave without becoming bogged down.

"Our operation is geared to top efficiency, and we eliminate as much hand labor as possible," explains Victor Cacavio. "We can't make a profit by hand-lugging each strip of sod a hundred feet, then have to pull the truck out of the mud."

As many as 15 persons are employed during the sod-cutting season, which runs from April to October. A permanent crew of eight

Sod farm converts soggy fields into showplace as "biggest lawn in township"

By Frederick A. Mahn

Work unit conservationist, SCS, Mount Holly, N. J.

men plant, raise, and mow the grass during the rest of the year.

The Cacavios expanded Mercer Sod's operation 2 years ago when they bought two additional farms, and thus added 213 acres to the original 140. At that time they made an overall conservation plan with the help of the SCS staff. Since then they have added another 122 acres.

"We had to rely completely on surface drainage because our soil is so heavy (clayey)," Victor Cacavio said. "The SCS men came up with a plan to run the ditches into one end of each of our three irrigation ponds and out the other end. This way, we keep as much rainwater on the farm as we can

without ruining the sod. They suggested several diversion channels to run crosswise on our 40-acre sloping field to stop the lower half from eroding after we cut sod. We find these diversion channels also keep water off the low flat areas."

The results were so satisfactory that the owners decided to build a shallow V-shaped grass-lined ditch in each field and also to reshape the land before each seeding of grass.

The Cacavios use all the earth that is dug from ditches and ponds to shape and grade the sod fields. The grading serves a double purpose by permitting an even distribution of irrigation water along with the drainage benefits. ♦

Fields on the Mercer Sod Farm are leveled before each planting to make efficient use of irrigation water and facilitate drainage in wet seasons.



Contractors learn survey techniques



Carroll Drablos, University of Illinois extension engineer, levels the instrument as Contractor Robert Goodwin of Kankakee looks on. Clyde Day, president of Illinois Land Improvement Association and John Whelan, SCS area engineer, steady the rod.

Benchmarks and backsights became common terms for 229 conservation contractors in Illinois recently. Seven engineering survey workshops were sponsored by the Illinois Land Improvement Contractors' Association, the University of Illinois Cooperative Extension Service, and the Soil Conservation Service. The 2-day workshops were designed to prepare contractors for surveying more of the smaller conservation jobs.

The schools were planned after land contractors displayed a strong interest in learning the survey skills they need to do their job well.

In order for farmers to receive cost-sharing payments for construction work, SCS conservationists must check the completed projects. As more farmers request payment for conservation projects, SCS workers have not always been able to check each step as soon as it is completed. So the time required to do a job sometimes drags out while both the farmer and contractor wait for approval.

The contractors felt that if they could stake out and check some smaller jobs, they could leave a finished project before the final SCS check and be confident that they would not have to return.

The arrangement also saves time for SCS employees. State Conservationist L. H. Binnie says, "It eliminates our technicians having to live on the job. This is important when *our work force* is assuming an ever-increasing workload without increase in personnel."

Professors Ralph Hay and Carroll Drablos, agricultural engineers of the University of Illinois, conducted the schools with help from SCS area engineers in the seven locations. Professor Hay says, "This year's classes dealt with the basic principles of surveying. Next year we plan to make actual surveys for some of the major conservation practices."

Clyde Day, conservation contractor from Gibson City and president of Contractors' Association, says the workshop will benefit contractors not only by saving time but also by helping them to get more jobs. "If a contractor can show the farmer that a job is feasible by running a quick survey, he can sell the job right on the spot."

These schools benefit the farmer, contractor, and SCS, but even more important they help to put more conservation on the land. ♦

Community benefits from training work

The Soil Conservation Service along with other public service agencies is helping improve the skills of earthmoving equipment operators at the Operating Engineers' Training Center established at Woodsfield, Ohio, under the Manpower Development Training Act.

The result is better jobs for the operators who complete the training. A byproduct is a half-million dollars worth of construction work completed to date by the students in the training process.

SCS helped plan and lay out and supervise the grading of a new airport and a modernized fairgrounds for Monroe County, on which the student operators worked. By the end of the first year, about 200 young men from all parts of Ohio had gained experience under skilled supervision in the operation of bulldozers, scrapers, graders, industrial tractors, ditching machines, and the like, and had completed courses in surveying, maintenance, and welding.—NEAL C. BEERY, *work unit conservationist, SCS, Woodsfield, Ohio.* ♦

Getting equipped for conservation work

By **G. E. Ryerson and D. A. McAllister**

Director, Administrative Services Division, SCS, and vice-chairman, Soil and Water Conservation Committee, Farm and Industrial Equipment Institute.

One of the most significant single contributions to resource conservation progress in the past 20 years can be attributed to, of all things, a committee.

It was a Soil and Water Conservation Committee formed some 20 years ago by the then Farm Equipment Institute, now the Farm and Industrial Equipment Institute (FIEI). In the 1940's that organization recognized that effective soil conservation required a joint approach—by those who understand the shape land must take to be fully productive, and those who know how to build equipment to reshape the land. It was an early attempt to share and blend the knowledge of both arts to the landowner's ultimate benefit.

Dealers and districts

From that beginning, several projects soon took shape. One of the earliest was the "Dealer-District" program.

This program was developed primarily to show dealers in particular, and the industry in general, that agriculture was changing, and that cooperation with soil and water conservation districts was a practical way for farm equipment dealers to become acquainted with the changes taking place in their trade territories.

A booklet, entitled "The Farm Equipment Dealer and his Soil Conservation District," was published to explain the workings of a district—a new type of institution at that time unfamiliar not only to dealers but also to most merchants.

The program also included many promotions, such as awarding pla-

ques to dealers for outstanding participation.

Other projects

Another later project of the Soil and Water Conservation Committee was the production in cooperation with the National Association of Soil Conservation Districts of a soil stewardship movie entitled "The Earth is the Lord's." The film has been made available to many local groups through the Institute, soil conservation districts, and churches. A total of 1,200 copies has been made. Already shown to millions of viewers, the film has helped bring about greater awareness and understanding of the importance of soil and water conservation.

The Soil and Water Conservation Committee was the original sponsor of the National Association of Soil and Water Conservation Districts' newsletter contest. The contest has been expanded several times to encourage more districts to produce newsletters.

Much of the work being carried on by conservation districts included the reshaping of farmland by construction of terraces, waterways, and farm ponds, by land leveling for irrigation and drainage, and by many other operations. At first, this work was done mainly by the farmers themselves. But more and more small contractors entered the picture, calling themselves terrace or pond builders, drainage contractors, or land-leveling contractors, and the like. Many of them began to call themselves conservation contractors.

Some of these men organized into State groups. Eventually, sev-

eral State groups in the Midwest combined into a loosely knit organization called the Land Improvement Contractors of America.

At about this time, the watershed program began to be a major factor in earthmoving activities. As more and more contractors participated, equipment manufacturers found them a growing factor in their annual sales.

The Soil Conservation Service and the equipment manufacturers both began to feel the need for some means of talking to these groups collectively, to explain the kind of work expected, and to recruit more capable and conscientious contractors for conservation construction. At that time, there was no nationwide group to represent the small contractors.

Many of the larger operators were members of the Associated General Contractors. FIEI's Soil and Water Conservation Committee, with SCS support, decided to encourage the further development and strengthening of the Land Improvement Contractors of America.

Contractors' workshops

A workshop was held in Oklahoma City in January 1963 where contractors, engineers, and administrators discussed problems of improving performance through better understanding of work to be performed, more efficient methods of earthmoving, and better business management. The presentations were made by experts from FIEI member companies and from the Soil Conservation Service. Response was favorable, and the workshop was repeated. Since 1965, three workshops have been held

each year, and the participation is impressive.

In 1964, members of the equipment industry were asked to participate in an SCS-sponsored series of contract administration training meetings. This series served to acquaint FIEI members with problems of contract administration and legal requirements in carrying out watershed work by contract and to bring about a better understanding on the part of contractors, manufacturers, and SCS personnel of each other's problems.

Primary objective of both the manufacturers and SCS has been to encourage contractors to consider themselves equal partners in the conservation program, in which well over a billion cubic yards of earth are moved each year.

The importance of watershed work performed under contract through competitive bidding has been recognized by the Associated General Contractors, which now has established a permanent Soil Conservation Service Liaison Committee. The committee meets at least annually to discuss problems of mutual concern to both contractors and SCS. Additional liaison committees are now being set up between the Associated General Contractors and various SCS State offices. These committees have brought about a better understanding of what is being sought by the Government in watershed project contracts and the basis on which contractual problems can be solved.

Twenty years ago the FIEI served as a catalytic agent in the development of an effective national soil conservation program. Today, conservationists in the Soil Conservation Service and equipment manufacturers and dealers and earthmoving contractors through their organizations are bringing their special talents to bear on the problem in a continually more sophisticated manner that bodes well for the improvement of our country's natural resources. ♦

To the Grange, conservation is "special"



Maurice Gross, *Grange Herald* business manager, Mrs. Adelaide Perry, managing editor, and Charles Boothby, executive secretary of the Maine Soil and Water Conservation Committee (left to right) plan the 18th annual soil and water conservation issue of the *Maine Grange Herald*.

The Grange in Maine this year published the 18th consecutive annual Soil and Water Conservation special edition of its statewide newspaper, the *Grange Herald*, which is received by more than 22,000 families.

One of the aims of the Grange is to make people aware of the need of conserving natural resources, says Mrs. Adelaide Perry, managing editor. The *Herald* is used to attain this objective.

Maurice Gross, *Grange Herald* business manager, Charles Boothby, executive secretary of the Maine Soil and Water Conservation Committee, and Mrs. Perry plan the paper's layout. Forty-seven articles and eighty-one photographs were submitted by Maine's soil and water conservation district supervisors, State and Federal conservationists, and many nonprofessional conservationists for this year's 44-page special edition.

The *Grange Herald* annually recognizes outstanding accomplishments of conservation district supervisors. The State Grange Master

presents the five outstanding district supervisors with individual cups and citations.

"In order for a person to be a good Grange member, he must be a good conservationist. And all good conservationists should be Grange members," says Mrs. Perry.—LAUREN H. LONG, assistant to State conservationist, SCS, Orono, Maine. ♦

"America The Beautiful" a teaching aid

A set of "America The Beautiful" photographs is being used as a teaching aid in India.

Most of the people for miles around Mahorashtra are farmers, and Joy Stevens, Peace Corps volunteer, finds that such pictures as field stripping, farmstead windbreaks, a parallel-terraced alfalfa field, contour stripcropping, and contour irrigation of ricefields are beneficial to this area.

He plans to change the name of the exhibit to "The American Farm" and use it as a teaching device for the village farmers. ♦

Topraksu, Turkey's soil and water conservation agency, is constructing reservoirs to store runoff water for irrigation of farmlands. It hopes to build about 200 irrigation reservoirs a year following procedures similar to those used in small watershed projects in the United States.

Since technical guidelines, standards, or handbooks are at a premium in Turkey, Topraksu and the Agency of International Development requested the Soil Conservation Service to furnish technical help on the design and construction of earth dams.

I arrived in Turkey in June 1966 on a 90-day assignment. After a briefing with AID and Topraksu officials, I made trips throughout the country observing existing irrigation structures as well as those under construction or proposed for future work.

Turkey's construction program

Most structures range in height from 20 to 40 feet and store up to 1,000 acre-feet of water. Each structure will irrigate 200 to 1,000 acres of land. Little use is made of principal spillways to control high flows, since the structures utilize irrigation outlets to draw down the stored water, and the flood flows are conveyed around the structures in rubble masonry or concrete chute spillways. Heavy equipment is generally used to place the rolled earthen embankments, but all other work is performed by hand.

Quality of design procedures and construction were related directly to the Turkish engineers' experiences and abilities. The engineers who had visited the United States and other countries were technically more proficient than others but did not always have the knowledge to carry the projects to completion without error. The extreme variability in technical approaches indicated the need for general design and construction standards.

Technical standards strengthen Turkey's irrigation projects

By C. D. Brehm,

State conservation engineer, SCS, Huron, S. Dak.

After providing onsite technical assistance and becoming acquainted with their problems, I helped Topraksu engineers develop several standards which provided guidelines to field personnel. These standards served to improve their hydrologic approach, hydraulic design, determinations of sedimentation rates, and, finally, the construction being performed.

Uniform standards help

This information was presented to a group of engineers from Topraksu in a week-long seminar. Following this, a technical committee reviewed the standards, interpreted them into the Turkish language, and will soon issue them to field personnel.

The completed standard should

be useful to Topraksu in uniting their effort for greater technical advancement. As we in the United States know, approved standards do not destroy individual efforts but enhance them because they provide opportunity for everyone to contribute to their original development and to make suggestions for their improvement.

Whenever a series of climatic events produce an effect on structures which are designed and constructed to uniform standards, a bench mark has been established so that future evaluations are more fruitful. Areas for improvement are quickly defined, and technical advancement is assured.

Topraksu expects to move forward in this manner. Turkey has the ability, the aggressiveness, and will to develop. ♦

Topraksu personnel with National Engineer Omer Bey (extreme left) examine test hole to determine foundation materials for the proposed Yedikler Reservoir in north central Turkey.



An idea that holds water...

Balloon dams keep celery in Celeryville

By Karl Reinhardt

Soil conservationist, SCS, Norwalk, Ohio

Imagine building a lake with a dam made of a long water-filled balloon fastened to a concrete slab set in the ground.

You could make the lake as deep or as shallow as you wanted by filling or emptying the balloon. Or you could drain it by emptying the balloon completely.

This idea is being used in the Celeryville Conservancy District at Celeryville, Ohio. Four balloon dams built into drainage ditches have changed the whole outlook of the community.

At Celeryville, landowners grow celery, lettuce, radishes, carrots, and green onions on about 1,200 acres of deep muck soil.

In the past, the cropland flooded after heavy rains because the water ran off the higher land into the low-lying muck area. Damage amounted to as much as \$70,000 a year.

Then, if it didn't rain during July and August, the crops dried



up. Many growers drilled wells to irrigate their crops, but they never had enough water.

The growers organized the Celeryville Conservancy District in 1953 to try to solve their problem of having either too much water or not enough. Soil Conservation Service engineers helped the district make a plan for controlling the water. It called for widening existing drainage channels to 50 feet so they would carry away floodwaters before they covered the fields.

A 75-acre reservoir was built alongside the main drainage chan-

nel. It is filled by pumping floodwater from the channel during winter and early spring, then letting it out slowly during the summer to irrigate the crops.

The improved drainage channels carry the irrigation water to the growers' fields, where the balloon dams hold it until it is pumped onto the land. In some cases it is distributed in reverse through the tile drainage systems.

When it rains, the dams can be partly emptied to let the extra water entering the channels pass over the top. In a severe storm, they can be completely emptied to

The balloon dam is made of rubber and can be filled with water to any height desired to control the water level in the ditch.

Channels are designed to carry surface water from the fields and to distribute irrigation water.



Harvesting vegetable crops provides many jobs in the Celeryville area.

A 75-acre reservoir stores water pumped from the ditches in wet seasons to be used for irrigation later.

use the full depth of the channel to carry away the floodwater. Then the dams can be pumped up again to hold back more irrigation water.

After a 5-inch rainstorm, John Buurma, who farms more than 500 acres of muck, commented, "Ordinarily we would have lost half our potato crop in a storm like that, but only about 2 acres was damaged."

The Celeryville muck soil is about 75 percent organic matter. When it dries, it is slowly oxidized. In the past, this caused a loss of about $\frac{3}{4}$ inch of muck a year. At that rate, in 40 years 30 inches of the soil would be gone, and much of the land would not be useful for growing vegetable crops.

By keeping the muck wet throughout the season, the oxidation, or subsidence, is slowed down to less than $\frac{1}{2}$ inch a year. Danger of muck fires is also ended.

Each year in late May, after most of the vegetables are planted, but while the plants are still small, another problem appears. When



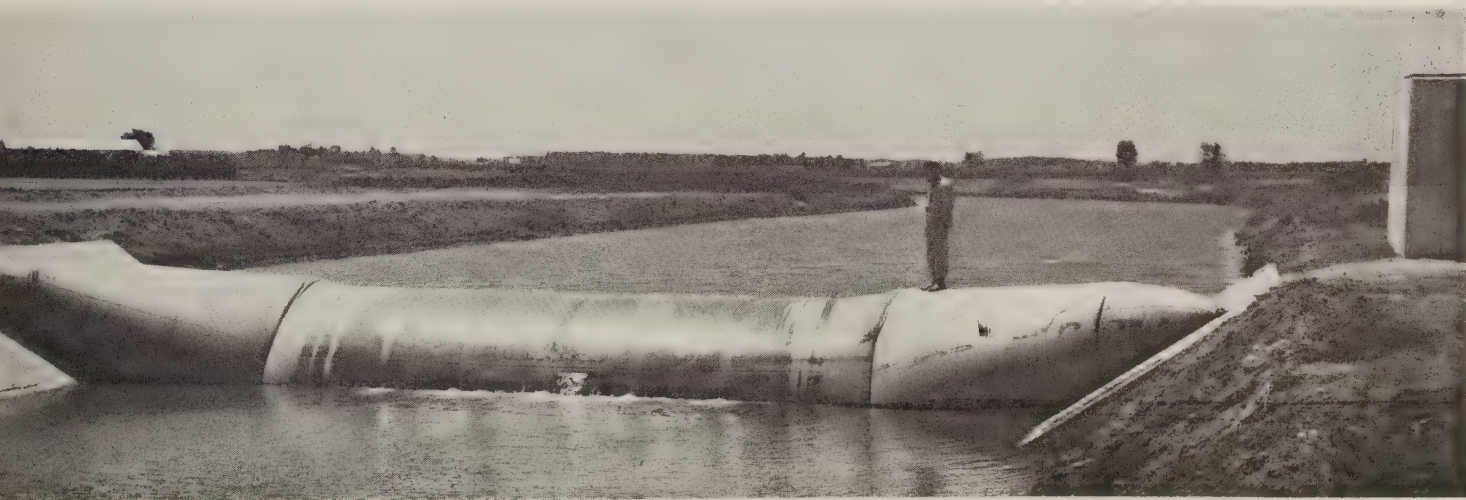
dry, the surface muck is so light that the wind blows it up into black dust clouds. Windbreaks and cover crops have been established to reduce wind erosion. Farmers also sprinkle the muck to keep it from blowing. The new reservoir and irrigation storage give the growers enough water to keep the soil surface wet when there is danger of wild erosion.

When there is danger of frost, sprinkling is used also to keep the plants from freezing.

The total average benefits from the project are estimated at about

\$190,000 each year. About \$100,000 of this is from the reduced flooding and \$90,000 from the irrigation water being available for growing vegetables and reducing oxidation and wind erosion of the soil. The total cost of the project is about \$1.4 million dollars.

Ben VanZoest, former vegetable grower who is now the contracting officer for the Celeryville Conservancy District, says, "The improvements in flood control and irrigation water supply have increased the grower's returns by at least 25 percent." ♦



Training sessions help teachers to take conservation into their classrooms

By Frederick E. Bubb

Work unit conservationist, SCS, Allentown, Pa.

Several times a week your office phone rings and a voice says, "I'm a teacher and we're starting a unit on conservation. Could you come out and speak to the class? Could you make it for a half day? I really don't know much about conservation."

Soil Conservation Service employees of the Allentown, Pa., office discussed this matter with directors of the Lehigh County Soil and Water Conservation District and representatives of the district's other cooperating agencies. They found that the other agencies were having the same problem of too many requests and too little time to fill them.

The problem appeared to be that many school teachers have little training in natural resource conservation. They are at a loss, therefore, when called upon to include some attention to conservation in their classes in the traditional subjects taught in elementary and secondary schools. It is then that they call on the conservation agencies for help.

Teach the teachers

The district directors and conservationists concluded that the solution would be for the professional conservationists to educate the teachers so they would feel qualified to teach the subject.

How could this be done? They decided to start at the top. They went to Dr. William Bartholomew, county superintendent of schools, and to Henry Messinger, head of science education for the Allentown schools. They found both men enthusiastic about setting up

a teacher-education program in conservation.

The first all-day training session was held at Camp Horseshoe in the fall of 1964. Forty-five teachers from the Allentown schools attended. The following year, 100 teachers from the county schools took part. From now on, all-day outdoor training sessions are to be held—one in the fall at Camp Horseshoe for 110 county teachers, the other in the spring for 70 Allentown teachers. The latter is held at the city of Allentown fish nursery along Little Lehigh Creek.

The program is now well established. The Lehigh County District sponsors the program, and

local "talent" does the teaching.

At each session, the first hour is devoted to lectures. Grant White, head of the Lehigh County Cultural Center and a former science teacher, presents an illustrated talk on the materials available locally for teaching about natural resources. Miss Ethyl Evans, a Parkland High School English teacher, tells how she uses conservation in her classes. Her point is that conservation does not have to be limited to science classes. She also uses the out-of-doors for teaching because she finds that her students are motivated more in this environment.

Rotating sessions

The teachers are divided into four groups and attend four training centers on a rotating basis. These are operated by local personnel of SCS and Pennsylvania's Game Commission, Fish Commission, and Department of Forests and Waters. All instructors strive to keep the sessions informal.

For proper environment, the

Grant White, head of the Lehigh County Cultural Center, explains plans for the future in a section of Parkland High School's outdoor conservation laboratory. This part of the laboratory is an abandoned iron-ore mine.



training centers are located in areas that have a stream, an open field, and woodland.

If demand is a guide, the training sessions are a success. For last fall's sessions, for example, more than 300 county teachers applied.

The Lehigh County District also sponsors a 5-day "in-service" program in cooperation with the office of the county superintendent of schools. This detailed training program is designed as a follow-up of the 1-day training sessions. For the first 4 days, specialists of one agency each day take the

teachers to the field for practical experience in resource education. On the final day, a session is conducted in an outdoor environmental laboratory. This session gives the teachers suggestions on how to use the training they have received.

What is the program's future? The county has 1,800 teachers and the city of Allentown, 1,700. Both groups hope to have every teacher attend at least the 1-day session.

Six of the 10 school districts now in Lehigh County have established or are establishing an out-

door conservation laboratory. These vary in size from a few to 48 acres. Two are at elementary schools. Three are located at the high school, and one serves both elementary and high school. All are being established with student labor, much of it during school hours as a part of instruction.

In addition, about 500 teachers in Lehigh County now have a better background in conservation and will be more willing to teach conservation.

Those phone calls for classroom instruction are decreasing. ♦

Stable water level improves wet woodlands

Timberland owners in the Dixie Soil and Water Conservation District of Florida are beginning to install water-control systems in their wet woodlands to improve the growth of valuable hardwoods, make sites more favorable for pine, and provide year-round accessibility for harvesting marketable timber.

In response to a request from several cooperating landowners, the Soil Conservation Service prepared a plan for the Pumpkin Swamp area near Cross City embracing about 34,000 acres of cypress, hardwood, and pine flatwoods.

The Hudson Pulp and Paper Corporation has begun work on a 15-mile-long main channel following natural drainage lines. Lateral channels will be added to carry excess surface water from the entire area.

The swamp will not be completely drained, however. Channels will contain control structures to stabilize the water level. The result will be favorable moisture conditions for tree growth the year around, rather than alternate flooding and drying as in the past.

SCS engineers planning the system were able to take advantage of an unusual natural feature of the terrain—a hard layer of rock, clay, and marl near the surface—to provide for control structures in the

channel at low cost.

Since the channel bottom, for much of its length, would be excavated in this hard layer, it was a simple matter to leave the material in place at strategic points to control the water level. The backhoe operator, according to plan, raises the bottom of the channel to the specified level for a few feet, then resumes the deeper excavation.

Cecil James, district forester for Hudson Pulp and Paper Corporation, believes the water-control program will make the swamp a better

habitat for fish and wildlife, as well as aiding timber production.

After the system is installed, deer and other game will have year-round water supply in the area. Before, they were forced to leave during extended dry periods.

Fish will thrive because of the constant water level in the channels, whereas formerly surface water completely disappeared from most natural channels.—EDWARD D. HOLCOMBE, *woodland conservationist, SCS, Gainesville,* and JAMES W. NORRIS, *agricultural engineer, SCS, Lake City, Fla.* ♦

One of the natural rock structures in the Pumpkin Swamp main channel shows the "teeth marks" of the backhoe used in excavation. The spoil in background will be leveled for a road.



SCS and industry aid timberlands

Timberland owners in Conecuh County Soil and Water Conservation District, Ala., are doing a much better job in managing forest resources these days.

It all began when two conservation-minded men from the Soil Conservation Service and private industry found ways of increasing forestry income and improving the general economy of the area.

Luther Gowder, SCS work unit conservationist, and D. K. Bodiford, forester for Container Corporation of America, began their joint efforts toward woodland improvement 2 years ago. Since that time, they have been able to show landowners how to do more timber stand improvement work, site preparation and planting, intermediate thinning, and selective harvesting than they had been able to do separately.

For example, one landowner, who owns 900 acres of woodland, had been weeding his woodland

for 10 years or more but had not realized any income from sale of timber. Then Bodiford helped him mark his trees for cutting. By working together Bodiford and Gowder were able to help him establish a paying forestry program.

The Conecuh County District has a large potential for further development of its woodland. About 75 percent of the district, or more than 400,000 acres, is in woodland, about half belonging to small landowners and the remainder to seven large lumber and pulpwood companies.

Recent surveys and estimates made in the county reveal that 40 percent of the woodland is understocked and 38 percent needs some kind of stand improvement. The gross income from forest products in 1964 was \$1,850,000, or about one-third of what the county's timberland is capable of producing.

Each year since the conservation district and private industry began working together on woodland improvement, the income from forest products has increased. Already more than 25 landowners,

owning 3,000 acres of woodland, working jointly with Gowder and Bodiford have initiated better woodland-management programs, including such practices as reestablishing pine on scrub hardwood areas, selective thinning of immature stands, and deadening of cull trees that were interfering with the growth of desirable young pines.

In 2 years, the conservation district's annual report showed the following increases in the rate of establishing woodland practices: Intermediate cutting, from 269 to 6,086 acres; harvest cutting, from 354 to 3,363 acres; and woodland weeding, from 28 to 2,044 acres.

The Soil Conservation Service and Container Corporation work with the district cooperators in a number of ways. Soil survey information and woodland-suitability guides provided by SCS give the landowners a guide to potential production, spacing, and preferred species for individual woodland sites.

Specialized forestry services, such as marking and estimating timber stands, are provided by company foresters. Both Gowder and Bodiford are able to recognize the landowner's needs and either help him or direct him to someone who can.—W. C. AIKEN, woodland conservationist, SCS, Auburn, Ala.

Seedlings on Laughlin Soils

Seedlings on Laughlin soils have greatly improved cover and increased moisture intake as well as increasing forage yields. The seeded grasses have extended the grazing period from 8 to 24 weeks and improved forage quality in an area badly needing better forage supplies.

Laughlin soils are low in fertility, heavily leached, acid, and have a low base saturation. Soils with similar problems occur widely, and the information from the tests will be useful over a large area. ♦

Frank Brantley, landowner; Luther Gowder, Soil Conservation Service; and D. K. Bodiford, Container Corporation of America (left to right), each stands by a young pine that has been released by deadening cull hardwoods.



Grazing plan improves pasture



Louis Perez examines little bluestem grass in a pasture that has been deferred.

A conservation plan developed with the assistance of the Soil Conservation Service has helped Louis Perez improve his native pastures from poor to good condition on his 135-acre farm in the Calhoun-Victoria Soil and Water Conservation District in Texas.

Perez became a cooperator with the conservation district in April 1959. He soon adjusted livestock numbers to reduce grazing pressure on the pastures that had suffered heavily during the drought of the mid-1950's.

He built cross fences to divide the farm into three pastures and installed water troughs in each pasture to aid in rotation grazing.

Perez's plan provides for year-round grazing. During normal years, he feeds only protein supplements. Hay is kept for emergency.

Two native pastures are grazed in combination with 16 acres of bermudagrass during the summer. One of the native pastures is saved for winter use.

To supplement their income, both Perez and his wife work on a nearby ranch. ♦

Flannel boards tell of conservation

"Too many cows are worse than plows."

This first-rate caption for a conservation poster was written by an 8-year-old from Laramie, Wyo.

The child's poster, along with about 400 others, was the result of a concentrated conservation education program sponsored by the Laramie Rivers Soil and Water Conservation District, Wyo.

Prior to the 1964-65 school session, the Laramie Rivers District supervisors promoted conservation education only in the upper elementary grades and in junior and senior high schools. Every year the Snowy Range Chapter of the Future Farmers of America received field and classroom training in the various conservation concepts.

Recently, the district supervisors brought conservation education to the lower elementary grades. With the younger children in mind, the supervisors enlisted the aid of the audio-visual department of the University of Wyoming, the Extension Service, and the Soil Conservation Service to plan a simple

and informative method of telling the conservation story.

An additional help was a book list on conservation subjects prepared by the Albany County Public Library. This list was mimeographed and made available to all teachers in the grade schools.

A flannel board was chosen as a principal method of communication. Caricatures were used to give the flannel board a cartoon effect and helped the children see the contrasts between a poor and good farmer or rancher.

The teachers remarked that a learning situation was provided, the subject matter was challenging, and this could easily be correlated with classroom work and discussion.

The flannel board conservation story was given to 62 lower elementary grades in and around Laramie. There were about 1,600 children in this group from 5 to 10 years old. Their story was also presented on a children's program on KFBC-TV at Cheyenne.

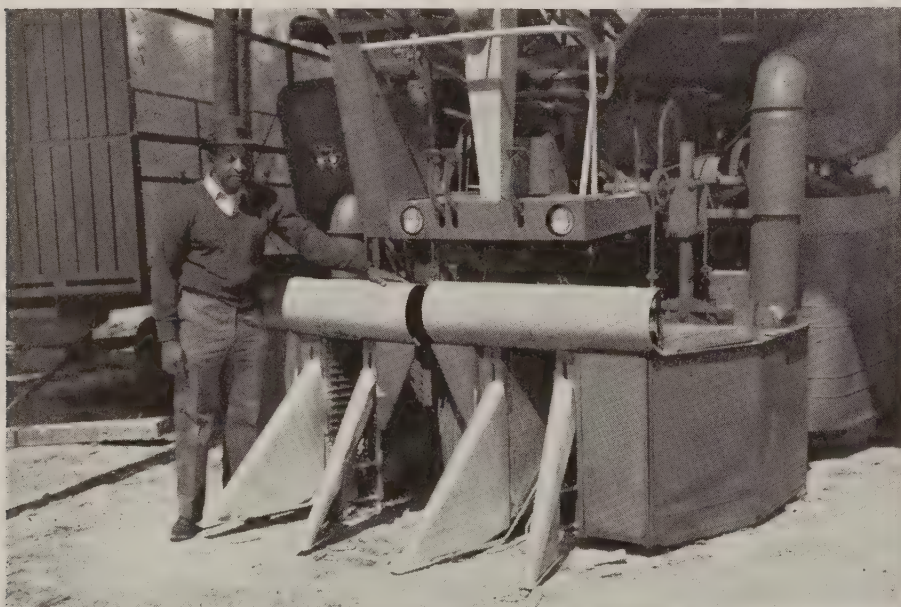
The Laramie Rivers District held its annual conservation poster contest during and after this flannel board effort. The 250 posters submitted often reflected ideas presented by means of the flannel board.

At the request of school principals, this talk was also given to about 1,400 students in the upper elementary grades. The narrative was adjusted to include technical terminology and more advanced conservation concepts. The enthusiastic response of these children indicates that the caricatures which are "more fun" than movies or slides for lower-grade students are also more interesting for upper grades.—DONALD J. HEYNE, *soil conservationist, SCS, Wheatland, Wyo.* ♦

Land users can accomplish much conservation with cultural and management measures that involve only the proper use and management of plants and their residues on the land. ♦



Thomas Bolton before his home with his father in 1958 (left) and with his wife in 1966.



Thomas Bolton's modern farm equipment includes a two-row cotton picker (above) and a tractor.



Farmer builds a success story with USDA help

Nine years ago, Thomas Bolton and his father sharecropped a small 100-acre farm for a fourth of the crops as rent. Today, Thomas Bolton and his family farm 251 acres of productive land, of which they own 40 acres.

The Bolton family has been farming in Shelby County, Tenn., since Mr. Bolton was a small boy. In 1958, Bolton and his wife decided to strike out on their own. They borrowed \$2,000 from the Farmers Home Administration, became cooperators with the Shelby County Soil Conservation District, and used the services of the Soil Conservation Service, Agricultural Stabilization and Conservation Service, and Extension Service to improve their farming.

They increased their net income from \$1,175 the first year to \$6,900 in 1963. In 1964, they purchased with an FHA ownership loan the small 40-acre farm where they now live. They own a two-row cotton picker, two large tractors, and a self-propelled combine. Their net worth has increased sevenfold since 1958 to \$25,000—*T. F. JONES AND JAMES ROGERS, work unit conservationist, SCS, and county supervisor, FHA, Memphis, Tenn.* ♦

Maine farmer first to complete program

A Penobscot County farmer and conservation district co-operator, Henry Page, is the first of 10 Maine Agricultural Conservation Program applicants to complete renovating an ugly gravel pit into an area of beauty.

The Agricultural Stabilization and Conservation Service through ACP is helping landowners renew and beautify the many unsightly gravel pits along the highways of our Nation. In Maine, ASCS set up a cost-sharing practice for shaping and seeding gravel pits for beautification.

The county extension agent developed an information program to acquaint the public with the program. The Farmers Home Administration lent special emphasis to beautification by making low interest loans available.

Mr. Page purchased an old gravel pit, with adjoining lands and buildings. At that time, he desired not only to beautify the area but to make it a source of income as well.

As a cooperator with the Penobscot County Soil and Water Conservation District, Page was helped by the Soil Conservation Service in planning the area before excavation began.

On seeing a contractor about the work, Page was told that the cost would be excessive. Page said, "Go ahead, I am paying the bills, I know what I want, and know that it can be done."

After excavation was completed, he had topsoil spread over the coarse gravel areas, and a heavy coat of barnyard manure was applied to the entire area. The soil was then disked, limed, fertilized, and seeded.

Page, a business man as well as farmer, is already realizing a return on his investment. The transformed gravel pits are taking on a new look. The first new enter-



Soil conservationist views abandoned gravel pit (above) as shown in its bare ugliness. The pit (below) is being converted into a hayland area of productivity and beauty.



prise is a restaurant which opened June 23. In late May he excavated the cellar for a 50-unit two-story motel, and construction is now un-

derway with the opening date set for December 1967.—HENRY E. LIBBY, work unit conservationist, SCS, Bangor, Maine. ♦

Meetings . . .

Equipment industry group meeting to discuss resource challenges

The 74th annual meeting of the Farm and Industrial Equipment Institute in Houston, Tex., October 15 to 18, will focus on the theme, "Food, Population and the Developing World."

This meeting is the big communications event of each year for the equipment manufacturers and is well attended by leaders of this and related industries.

The Institute, organized in 1894, represents makers of more than 90 percent of all farm equipment manufactured in North America and much of that made in Europe and the rest of the free world. This amounts to more than \$3 billion worth of goods annually in the United States and Canada and at least another \$1 billion worth in other countries.

Prominent among the Institute's cooperative and promotional activities are programs to encourage resource conservation, directed by its Soil and Water Conservation Committee.

"In the years ahead, the farm equipment industry will continue to do everything in its power to aid, encourage, and influence all phases of conservation work," says William A. Hewitt, president of F I E I and a member of the National Advisory Commission on Food and Fiber.

"As individual manufacturers, we also will be at work to set good examples of corporate citizenship in the field of air and water pollution control and in the conduct of our businesses.

"By the year 2,000, world population will be about twice as large as it is today, unless the rate of growth changes. To feed and clothe that 'second world' of people, the less developed nations must improve their agriculture far beyond present capabilities.

"An important part of that development, of course, will be proper conservation of their farmland. A valuable service to mankind will be the export of our conservation know-how and skills to other regions of the world. This is a new challenge to the soil conservation profession and the farm equipment industry.

"This is one of the challenges we will be discussing at the Institute's 1967 annual meeting."

Dates and places

October 1-6, American Institute of Planners, Washington, D. C.

2-5, National Association of State Foresters, Sacramento, Calif.

13-22, National Grange, Syracuse, N. Y.

15-18, American Chamber of Commerce Executives, St. Paul, Minn.

15-18, Farm and Industrial Equipment Institute, Houston, Tex.

15-19, Society of American Foresters and Canadian Ministry of Forestry, Ottawa, Canada.

16-20, American Society of Civil Engineers, New York, N. Y.

17-20, American Association of State Highway Officials, Salt Lake City, Utah.

24-27, American Forest Products Industries, Washington, D. C.

26-29, Sprinkler Irrigation Association, Scottsdale, Ariz.

29-Nov. 1, American Forestry Association, Las Vegas, Nev.

November

5-10, American Society of Agronomy, Washington, D. C.

5-10, Soil Science Society of America, Washington, D. C.

12-15, National Association of State Universities and Land Grant Colleges, Columbus, Ohio.

Outdoor Recreation Activity Grows

Public participation in major outdoor recreation activities has increased by 51 percent since 1960, and the trend is accelerating, according to a report, "Outdoor Recreation Trends," prepared by the Bureau of Outdoor Recreation.

Based on a nationwide survey of summertime activities, the Bureau estimates a fourfold increase in recreation participation between 1960 and the year 2000.

The report notes that walking for pleasure has become America's most popular form of outdoor recreation. More than 67 million persons take pleasure walks, averaging some 15 occasions each summer. This is an 82 percent increase since 1960, when it was the Nation's third most popular outdoor recreation activity.

Swimming is second in the ranking of public recreation activity and will move up to first by the year 2000, if present trends con-

tinue. Driving for pleasure, first in 1960, has fallen to third position.

Following in order come playing outdoor games or sports, up 96 percent since 1960; bicycling, up 105 percent; sightseeing; picnicking; fishing; attending outdoor sports events; boating; nature walks; camping; horseback riding; and water skiing.

Since the survey was directed at summertime activities, it does not include peak season participation in hunting, snow skiing, spectator sports, and other fall and winter sports. The survey did reveal, however, that almost 17 million Americans hunt and nearly 6 million snow ski each year.

The Bureau of Outdoor Recreation compiled the statistics on outdoor recreation participation for use in preparing a long-range nationwide outdoor recreation plan. A first version of the plan is due in the spring of 1968. ♦

Co-op Month 67 to be observed in October

Twelve Federal departments and agencies and nine national cooperative organizations will participate in observance of October as "Co-op Month 67" in Washington, D. C.

Five programs will center around subthemes of the year's theme: Cooperatives—A National Asset.

Cooperatives of all types are owned by both rural and urban people. Well over 20 million families get services through these user-owned businesses.

Among them are farmer marketing, purchasing, and credit cooperatives; housing, grocery, group health, and fishery associations; credit unions; rural electric and telephone cooperatives; and rural insurance, irrigation, and dairy breeding associations. ♦

District helps woodland owners sell pulpwood

Cooperation among small woodland owners, the Crockett County Soil Conservation District, and a pulp and paper company in Tennessee enabled farmers to make needed thinnings in pine plantations established by the Civilian Conservation Corps in the late 1930's and early 1940's.

The plantings were made to stop erosion on small critical areas, mainly 1 to 4 acres in size. They needed thinning, but pulpwood buyers were not interested in such small individual lots.

Earl Dunlap, a longtime supervisor of the Crockett District, got nine owners to agree to thin their pines according to professional recommendations. Two others wanted to clear-cut their woodlots and put the land to other uses.

Dunlap was then able to interest the Tennessee River Pulp and Paper Company in buying the combined 30 acres of cutting.

The cooperative effort, spear-

headed by the district, gave the owners an income from practicing good woodland management. — DOYLE A. TUCKER, *work unit conservationist, Alamo*, and C. M. HENNINGER, *woodland conservationist, SCS, Nashville, Tenn.* ♦

FHA loans to increase outdoor recreation

Through credit from the Farmers Home Administration about 153,000 people will be served by 282 outdoor recreational facilities.

FHA in 1966 advanced \$18.7 million in loans to groups of rural residents or individual farmers to finance farm and community recreation enterprises in 41 States.

Rural groups received most of the funds, \$17.8 million, to develop 150 community-sponsored recreational facilities such as swimming pools, picnic parks, small golf courses, and lakes.

Sharing in the total loans were 132 individual farmers who received \$873,000 to carry out construction, buy equipment, and pay other expenses for developing income-producing public recreation facilities on their farms. ♦

Unfavorable soil conditions

Unfavorable soil is the dominant problem on about 55 million acres of cropland in the United States, according to the National Inventory of Soil and Water Conservation Needs (USDA Misc. Pub. 971). Of this, more than 36 million acres or 66 percent needs treatment.

Unfavorable soil is the only major problem on 19.0 million acres, of which nearly 12 million needs treatment. It is the secondary problem on about 45 million acres of additional cropland needing treatment where other problems are dominant. ♦

RC&D projects

Resource Conservation and Development projects range from 1/4 to 3 million acres and generally are larger than a single county. ♦



Water Pollution Control and Abatement. EDITED BY TED L. WILLRICH AND N. WILLIAM HINES. 1967. *Iowa State University Press, Ames.* 194 pp. \$4.95.

Ten years ago the most urgent questions concerning water were adequacy and allocation of the supply. Today, the crucial question is quality.

A seminar sponsored jointly in 1965 by Iowa State University and University of Iowa examined the problem of water quality and resulted in this book as a sequel to *Iowa's Water Resources: Sources, Uses, and Laws* based on a similar conference in 1955.

The first section looks at the water problem through the specialized vision of four disciplines: engineering, economics, law, and political science. The next reviews the water situation in Iowa. The final chapters shift the analysis to the four interest groups—municipalities, industry, agriculture, and outdoor recreation—most often involved in water-pollution conflicts.

A paper on "Agricultural Pollution—Sources and Control," by George M. Browning, regional director of North-Central Agricultural Experiment Stations, covers much the same ground as the article by C. H. Wadleigh in the September issue of *Soil Conservation*.—B. O.

New publications

Surface Mining and Our Environment. BY STRIP AND SURFACE MINE STUDY POLICY COMMITTEE. 1967. *U.S. Dept. of Int.* 124 pp., illus. \$2.00. A report prepared in response to the Appalachian Regional Development Act which directed the Secretary of the Interior to survey the problem of surface mining and recommend to the President a long-term program for rehabilitation.

The technical working committee included representatives of 13 agencies of

the Departments of Interior, Agriculture, Army, Commerce, and Health, Education, and Welfare, plus the Tennessee Valley Authority and the Appalachian Regional Commission.

The result is a comprehensive view of the extent of surface mining in the mainland United States and its effect on land and water resources, presented in the colorful and dramatic style that has characterized recent publications of the Department of the Interior.

The recommendations call for reclamation by the owners of lands mined in the future and Federal assistance in reclamation of previously mined areas.

Food and Fiber for the Future. BY NATIONAL ADVISORY COMMISSION ON FOOD AND FIBER. 1967. *Government Printing Office*. 361 pp. \$1.25. The report to the President by the commission established by Executive Order in November 1965 to appraise agricultural and foreign trade policies contains a 20-page chapter on natural resources. A number of conclusions and recommendations bear on programs of resource conservation.

In describing the facts about the country's soil and water resources, the report leans heavily on the Conservation Needs Inventory. It contains a section on the water problem, asserting that, as with soil, there is no real shortage but more a matter of proper management and allocation. It contains sections on forestry and rangeland.

The findings and opinions of the commission undoubtedly will weigh heavily in consideration of resource policies and programs for the future.

Agriculture/2000. 1967. *U.S. Dept. Agr.* 72 pp., illus. Gathered into this booklet are six addresses of the Secretary of Agriculture that summarize the current philosophy and goals of the Department.

The "blueprint for action" looks to the future in six specific areas around which the activities of the department are currently organized. They are: (1) Income and Abundance, (2) Communities of Tomorrow, (3) Resources in Action, (4) Growing Nations—New Markets, (5) Science in the Service of Man, and (6) Knowledge for Living.

This booklet is to be regarded as a policy handbook for all employees of the Department.

Science and the City. (1967). *U.S. Dept. of Housing and Urban Development*. 43 pp., illus. \$0.45. Summary of a 3-weeks' Summer Study on Science and Urban Development in 1966 sponsored by the Department of Housing and Urban Development and the Office of Science and Technology of the Executive Office of the President.

A Strategy for a Livable Environment. BY THE TASK FORCE ON ENVIRONMENTAL HEALTH AND RELATED PROBLEMS. 1967. *U. S. Dept. of Health, Education, and Welfare*. 90 pp. A task force created by DHEW Secretary John W. Gardner recommended action goals on 10 items of concern to that Department; namely, air quality, water quality, waste disposal, population research, urban improvement, control of chemicals and synthetic materials, consumer protection, radiation control, occupational disease and safety, and standards for physical and mental health for housing, urban development, and transportation.

National Wildlife Refuges, 1966. 1967. *U.S. Dept. Int., Bur. Sport Fisheries and Wildlife Resource Pub.* 32. 29 pp., illus. There are 312 refuge units in all but five States, with a total of about 28½ million acres in the system. This publication reports on the functions of some of the refuges, presents information on endangered species, and explains the establishment of the Job Centers on four of the refuges.

Catalog of Federal Assistance Programs. 1967. *Office of Economic Opportunity*. 701 pp.

Land Forming. BY LEE F. HERMSMEIER. 1967. *USDA Leaflet* 539. 6 pp., illus. A means of controlling surface water on level fields.

Soil and Water Conservation Around the World, 1967. *USDA Soil Conservation Service*. 32 pp., illus. \$0.25. Written in three languages for the 1967 Boy Scout International Jamboree held in Idaho, this book of pictures helps to show the practical application of conservation principles and to tell the story of soil and water conservation in many countries.

Effects of Monolayers on Insects, Fish and Wildlife. BY WILLIAM J. WILTZIUS. 1967. *U.S. Dept. Int. Bureau of Reclamation Research Report* No. 7. 67 pp., illus. \$0.50. This seventh report evaluates the influence on insects, fish, and wildlife of long-chain alcohol monomolecular films being used in the long-range research program to reduce evaporation losses in reservoirs.

Soil survey

Iowa County, Iowa. BY J. D. HIGHLAND AND R. I. DIDERIKSEN. 1967. 162 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by J. D. Highland, W. D. Frederick, W. L. Fouts, M. P. Koppen, A. R. Hidlebaugh, S. M. Smith, and G. H. Simonson.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Illinois

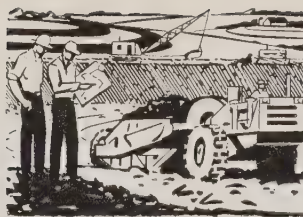
USDA SOIL CONSERVATION SERVICE

PARALLEL-TERRACED ALFALFA FIELD, OGLE COUNTY SOIL AND WATER CONSERVATION DISTRICT

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From the Administrator:

Industry a Partner in Soil Conservation



The extensive system of conservation programs now available to American landowners and to the communities in which they live is a result of the cooperation and involvement of the people the programs are designed to help.

Industrial and commercial interests have participated in this cooperation on equal terms with private citizens and local organizations. The farm equipment industry and related interests have been particularly active partners in the conservation movement. The progress of conservation work on the land has profited as a result, because of the importance of adequate equipment to perform the great volume of construction and land treatment needed all across the American land.

Soil and water conservation brought many changes in farming methods and called for new kinds of farm equipment to carry out the operations. Following World War II, equipment manufacturers and dealers joined with conservationists and landowners to meet the growing demand for conservation equipment.

Landowners had much catching-up to do in the conservation effort to repair damages caused by intensive cultivation during the war. There was a great need for replacing farm equipment that had been purchased prior to the war and which was not well adapted to the accelerating pace of agriculture.

Farmers also needed equipment better adapted to the conservation practices then being advocated. It was a common complaint that it was difficult, if not impossible, to follow recommended practices with the equipment then available.

The Soil Conservation Service began an active period of cooperation with the farm equipment industry through its trade association, then the Farm Equipment Institute. The Service and the industry collectively analyzed the equipment requirements of the "new agriculture" and the adaptability of existing machines to those requirements; they cooperatively searched for better ways of performing such new tillage operations as stubblemulching, strip-cropping, and contour farming, especially when these practices were combined with terracing and the protection of grassed waterways.

New adaptations of old machines which in turn resulted in the development of new trade patterns in the industry, were common. This was cooperation of a new sort, not only with land owners and operators but with an industry which also served agriculture.

When the watershed programs became active, an entirely new market for earthmoving equipment was created, and the construction equipment industry became interested in conservation. Before enactment of Public Law 566, agriculture had not been a market for their product. Suddenly it was. It was necessary that equipment and contractors be available to perform the huge volume of work which soon amounted to more than a billion cubic yards of earth to be moved annually.

During the same period, the Great Plains Conservation Program resulted in much additional work for the conservation contractor. Resource Conservation and Development projects and the Appalachian program also stimulated new work.

Here again, there was excellent cooperation with the equipment industry. SCS and conservation districts were able to indicate the size of the market and where future work was likely to take place. Cooperative programs were designed to help people in the industry learn how best to serve this new area of demand. In turn, the dealers began to play an active role in promoting and helping communities to develop new watershed programs.

Earthmoving or "land improvement" contractors also found a prominent place in conservation activity. An increasing amount of construction needed to be done that was beyond the means of the average landowner. Such work can best be accomplished by contractors. Contractors' trade associations cooperated with the SCS in training programs to show their members the kind of work needing to be done and the standards of performance that make acceptable work.

The needs for conservation equipment, and for efficient contractors to use it, have not been satisfied. The future holds even greater demand for the fruits of industry cooperation. Not only rural landowners but urban residents as well are becoming concerned about the availability and control of water and are demanding that flooding, sedimentation, and pollution be controlled.

Some of the exciting opportunities that lie ahead are spelled out in the new USDA publication, *Resources in Action—Agriculture /2000*. Whether the specific items set forth in this amazing look at the future all come to pass is beside the point. Many of them will, and many still unimagined will need to be done.

The Soil Conservation Service looks upon contractors, equipment manufacturers, and dealers as important and integral parts of the conservation team.

D. A. WILLIAMS



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Spot hydrants improve irrigation efficiency

Farmers in the Sierra and Navelencia soil conservation districts in California have installed "self irrigation" systems using a new type of outlet valve that regulates water discharge to permit more efficient water management with reduced labor costs.

The "spot hydrant" outlet was invented by Ben Baxter, a district cooperator of Fowler, Calif. He dedicated the patent to the United States of America as represented by the Secretary of Agriculture.

The "spot hydrant" is a valve that serves the function of the commonly used "orchard" or "alfalfa" valve. It consists of an extendible riser that moves as a sleeve in an orifice.

The top of the riser can be adjusted to any elevation within the limits of the length of the sleeve. This makes it possible to adjust all the outlets for any one "set" to the same elevation and so they will have the same discharge. The discharge of all outlets of a "set" then can be increased or decreased by a line gate making it possible to cut back the stream size at all outlets by one simple adjustment, without resetting each hydrant.

In normal operations, all spot hydrants are open. A particular "set" of hydrants can be made to flow by raising the hydraulic gradeline in that reach of the supply pipe lateral. This is done by use of line gates.



Since the discharge of a hydrant depends on the difference in elevation between the crest of the hydrant and the hydraulic gradeline, it follows that line pressures will generally be lower than in conventional systems where discharge is regulated by valve closures of orifices. Individual hydrants can be closed off by inserting a simple plastic cap over the opening.

Another feature of the system

is that it can be readily adapted to fully automatic operation by coupling it to time clocks, irrometers (tensiometers), or radio control.

A number of farms in the San Joaquin Valley have installed or converted their old pressure valves to this system.—MORRIS A. MARTIN, JR., AND DON E. DUNHAM, *work unit conservationist and engineering specialist, SCS, Fresno, Calif.* ♦

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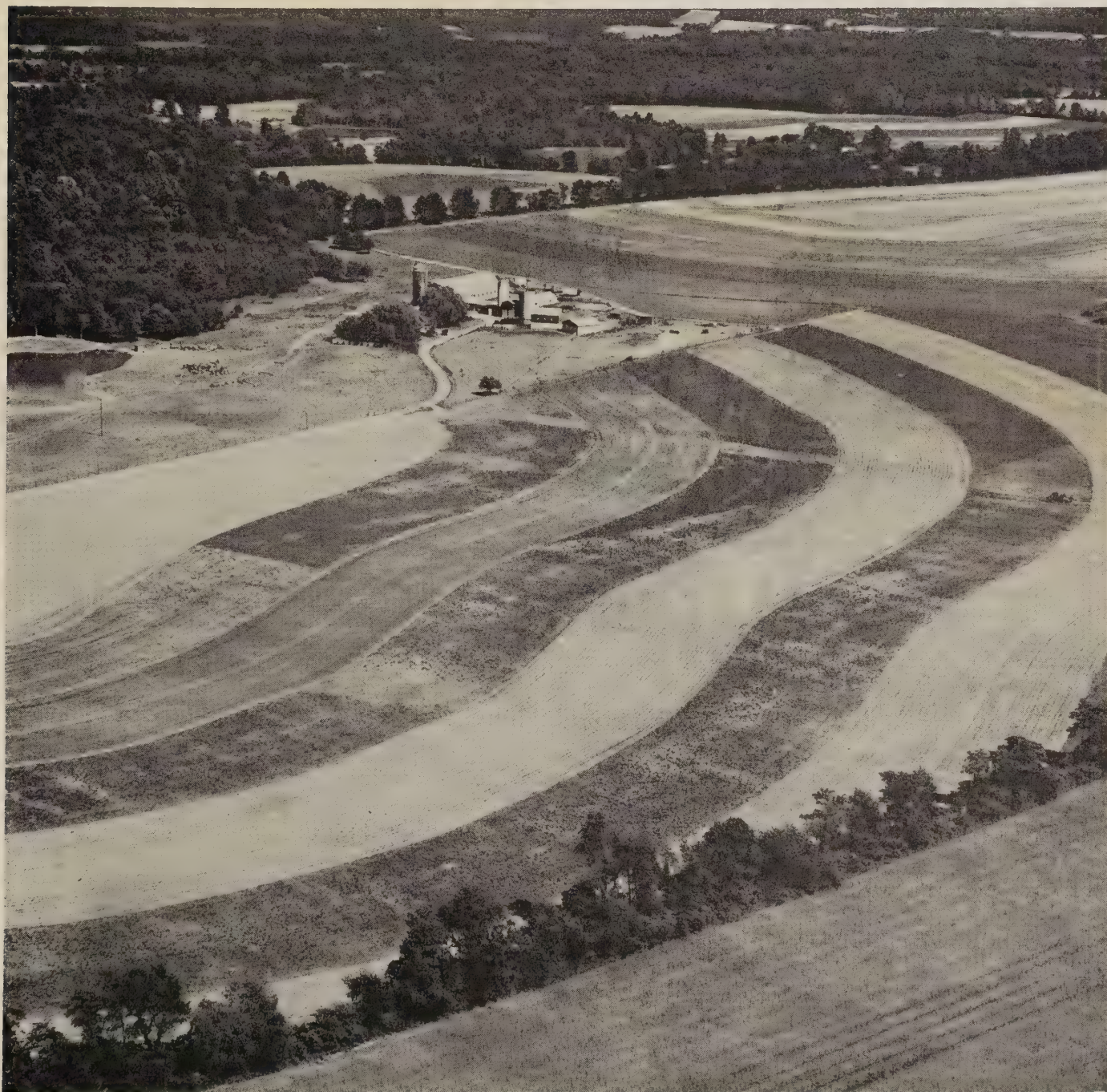
EROSION CONTROL TODAY

Soybeans
In the Northeast
Texas watersheds

Boy Scout Jamboree

soil
conservation
DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

4 KOSS
Beichley
Ahlstrom
Lester



SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: This familiar contour stripcropping pattern in the Hunterdon County Soil Conservation District, N. J., symbolizes the continuing role of erosion control in modern conservation programs.

Erosion . . .

How fares the land—the basic, essential farmland that feeds and clothes the Nation—in the face of the shifting attention of conservationists to problems of urban and suburban areas, recreation, beautification, and economic growth?

We posed this question to technical staff people. The response discloses both new and old problems of soil erosion demanding attention. It shows that a major part of SCS effort still goes into our original job of erosion control and is likely to continue to do so far into the future.

Soybeans: For one thing, changing agricultural enterprises bring new erosion hazards. Head Agronomist B. D. Blakely spotlights one such problem in his report on soybeans (p. 75)—a booming crop that too often invites erosion. His analysis relies heavily on information supplied by State Conservation Agronomists Clarence Jent of Tennessee, Robert Lawson of Illinois, and John Mad-dy of Iowa—three States where soybeans are expanding rapidly.

Maine to Texas: The old, familiar erosion problems are still with us too. Information Specialist Les Fox supplies some examples (p. 79) from the Northeast typical of the unfinished conservation work all across the Nation.

And Conservation Agronomist William Smith of Texas underscores the importance of project assistance in treating critical erosion areas in watersheds (p. 81).

soil conservation

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Soybeans

By B. D. Blakely
Head agronomist, SCS



Soybeans have replaced small grain, hay, and pasture on many Corn Belt farms.

The glamour crop has its problems

Raising soybeans without conservation measures on sloping fields or soils that are apt to blow could well take the glamour out of growing the crop. Serious soil losses have already taken place where fields are not adequately protected.

Some growers, too, have had disappointing results trying to grow soybeans on soils that are not adequately drained.

A soil loss survey on selected farms in west Tennessee, where intensive use is made of sloping upland for soybean production, showed an estimated average annual loss in excess of 20 tons per acre per year. This is four to seven times the established soil-loss tolerance for the soils involved.

Expanding acreage

To say that soybeans have suddenly become an important crop in American agriculture is not quite true. But a 13-million-acre jump in plantings in the past 5 years makes it a crop to be reckoned with in planning farm conservation programs.

In the Cornbelt, soybeans have

replaced a lot of the small grain acreage; in the South, large tracts of wooded areas have been cleared. Some of the Blackbelt of Alabama and Mississippi that once was in good grass is now in soybeans, and in the High Plains of Texas, 1967 acreages were more than double those of 1966.

Soybeans were first planted in the United States in the early 1900's. In 1924 there was less than 20,000 acres, and it was not until after World War II that the acreage used for seed exceeded that used for hay. By that time something less than 12 million acres of soybeans were grown.

In the past 5 years, the acreage of soybeans planted for seed has risen from 27,608,000 to an estimated 40,123,000.

Prior to 1960 soybeans were a relatively unimportant crop in Tennessee agriculture. This year soybeans occupy more land in the State than any other cultivated crop. From 394,000 to an estimated 1,185,000 acres in 7 years is the extent of expansion in this crop.

About 95 percent of the Ten-

nessee soybean acreage is found in a 12-county area in the western third of the State. The loess soil of the area, when unprotected, erodes very easily.

Prior to the build-up in soybean acreage, cotton and corn were given first preference in land selection in this section of Tennessee. These crops were grown on the well-drained and moderately well-drained nearly level hilltops and bottom lands. Soybeans took second place on the level wet bottom lands and nearly level fragipan (hardpan) soils. The soybean acreage then was confined to the larger farms where ample level land was available for row crop use. Erosion was not a serious problem under those conditions.

Serious erosion hazards

Soybeans are now being grown on many thousands of acres of sloping upland where serious erosion hazards exist. Most of this upland is being continuously cropped to soybeans, with little use of conservation practices. In fact, a considerable acreage that was formerly in perennial pasture and



Soybeans planted in straight rows up and down the slope bring back the old problem of erosion and sediment deposits on Southeastern fields.

hay crops is now being used to grow soybeans.

Iowa has more than doubled its acreage of soybeans during the past 10 years. Plantings increased again this year to more than 5 million acres. This is nearly one-half the acreage of corn grown for grain.

During this period, small grain, hay, and pasture acreages have decreased. Row crops increased more than 2 million acres, and most of the gain was in soybeans.

The greatest increase in soybean

acreage has occurred in north central Iowa. This area is fairly level to gently rolling, and although water erosion is not generally severe, wind erosion is an increasing problem.

More profit, less risk

A number of reasons account for the phenomenal expansion in soybean production, foremost being the strong demand and favorable prices in recent years.

In the short-run, there is more profit and less risk in producing

soybeans than in most other farm enterprises. Studies indicate that net returns are from \$3 to \$9 an acre higher from intensive use of land for soybeans than from conservation cropping systems that keep soil losses to safe tolerances.

In addition, soybean production is highly mechanized, and labor requirements are low.

For example, Delmar Corderman, who lives in the Sac Soil Conservation District in Iowa, used to be a dairy farmer with 40 percent of his cropland in hay and pasture. Most of his farm is now in corn and soybeans, with the remainder in diverted acres. He is now a cash grain and hog farmer. This change in type of farming is typical of countless other successful Cornbelt farmers.

Another factor contributing to increased row cropping is absentee ownership and large numbers of aged owners. These owners cash-rent their lands on short-term agreements. Lessees are inclined to use all suitable land for row crops with little consideration for soil-conserving or other land-improving techniques.

Soybeans on sloping fields are an erosive crop—much more so than high-yielding corn. Under similar soil and slope conditions, soil losses on soybean fields are likely to be about 30 percent more

Finely tilled soils left bare after soybean harvest are vulnerable to wind erosion.



than where the stalks of high-yielding corn are left on the field. Soybeans do not leave a good cover of residues after harvest, and the soil is left unprotected against the ravages of wind and water.

Conservation is practical

But conservation farmers are meeting the challenge of controlling soil erosion on the increased acreages of beans and other crops.

Modern soil conserving practices are just as suitable for soybeans as they are for corn and similar row crops. Well-designed terrace systems, aligned contour farming and stripcropping systems, minimum tillage, and management of crop residues are all important in reducing soil losses. These practices are practical with modern equipment.

Arthur Raisch, who farms sloping land in the Franklin County Soil Conservation District, Iowa, states, "I have installed some of the new grassed backslope terraces, and now I can plant some soybeans on my rolling land without much loss of soil and water."

Conservation farmers seldom grow more than 1 year of soybeans on their sloping fields. They usually plant the beans between corn crops that are used for grain, or before small grain. Or, as in the South, they plant soybeans following a grain crop, using minimum tillage so as not to destroy the grain residues.

Many soil conservation district cooperators are doing an excellent job of controlling erosion on soybean fields. Farmers with livestock programs are using cropping systems that keep soil losses at or near tolerance levels. Others use conservation practices such as parallel terraces, diversions, contour farming, and grassed waterways.

Leaving the crop residues from the previous crop on the surface of the soil is an effective practice and one that is receiving more and more attention.



Direct planting into bermudagrass sod gives protection from erosion.

Phil Naeve, who operates a large farm with his brother in the Humboldt County Soil Conservation District, Iowa, says, "We have stopped plowing soybean ground in the fall. We disk once after harvest to anchor the soybean straw and prepare a seedbed for corn in the spring with a field cultivator."

Although minimum tillage practices that reduce soil losses are becoming increasingly popular, in far too many cases accelerated erosion goes uncontrolled where farmers have taken to the glamour crop of soybeans.

In Illinois, there are more than 5 million acres of soybeans. Most of the new acreage is in the Cisne claypan area in the southern part of the State.

It is estimated that 90 percent of the soybean growers in Illinois are using some type of conserva-

tion tillage operations—from no cultivation to not more than two cultivations—in combination with post-emergence herbicides. Some use chisel plows or disks to prepare a seedbed rather than the moldboard plow, and there is a trend to 20- to 30-inch row spacings; all have a beneficial effect.

Carl O. Huren, of the Franklin County Soil Conservation District, Iowa, who is stripcropping and building parallel terraces, sums it up this way: "We need to work the ground less and improve a way of putting the crop in with very little soil movement or disturbance and use a better herbicide to control weeds without cultivating."

So, soybeans can be safely grown and are a profitable crop, if needed conservation measures are applied. Otherwise, they can be a problem because of excessive soil and water losses. ♦

A look at farming in Niger

By Robert M. Craig

Conservation agronomist, SCS, Gainesville, Fla.

One gains a new appreciation of the value of natural resources from an on-the-ground study of the agriculture of Niger, Africa.

I had this experience as a member of a five-man USDA team that evaluated U.S. agricultural assistance projects there in the spring of 1966 and reported on additional needs.

We found that soil conservation is a new term to the Hausa farmers who live in west-central Africa. When we explained in detail what it means, they translated it into the Hausa language as "health of the soil."

Let's take a look at an average Niger farmer and his resources:

He is farming a few acres of sandy, infertile soil in a 20-inch rainfall belt. The rains come during a 3- to 5-month period, with none at all during the remainder of the year. He has no mechanical or animal-drawn equipment or

even adequate hand tools. Fertilizer costs three times what it does in the United States. His annual income is less than \$100. His education is very limited, and he has no capital or ready source of borrowing money. There is practically no source of technical help from Government agencies, such as the Soil Conservation Service, Farmers Home Administration, Agricultural Stabilization and Conservation Service, or Agricultural Extension Service in the United States.

At one of the meetings, we learned that the local farmers' principal need was for tools to produce more food for themselves. They said that they could use a small garden-type tractor. When asked how they could keep the tractor in operation, they said they would take the smartest young man in the village and in some way train him to do the job.

The farmers know that there are

more effective ways to produce food by using better plant varieties, insect control, and other improved practices. They want to learn the improved methods.

The nomad cattlemen, who move their cattle with the rains, are often in conflict with the farmers when they move into cultivated areas and their cattle break into and graze the fields. The nomads prefer not to move into these areas. They want instead the know-how and ability to raise enough food in the natural range areas.

Other groups said they hated to see the water going to waste down the watercourses during the rainy season. They wanted to hold this water back to irrigate another crop during the dry season. If they knew how, it would be possible for the villagers to work together in building and financing the necessary water-control structures.

They also need water control along the major rivers to irrigate crops. They wanted to know about better methods of drawing water from their open wells. Now, this task is all done by hand.

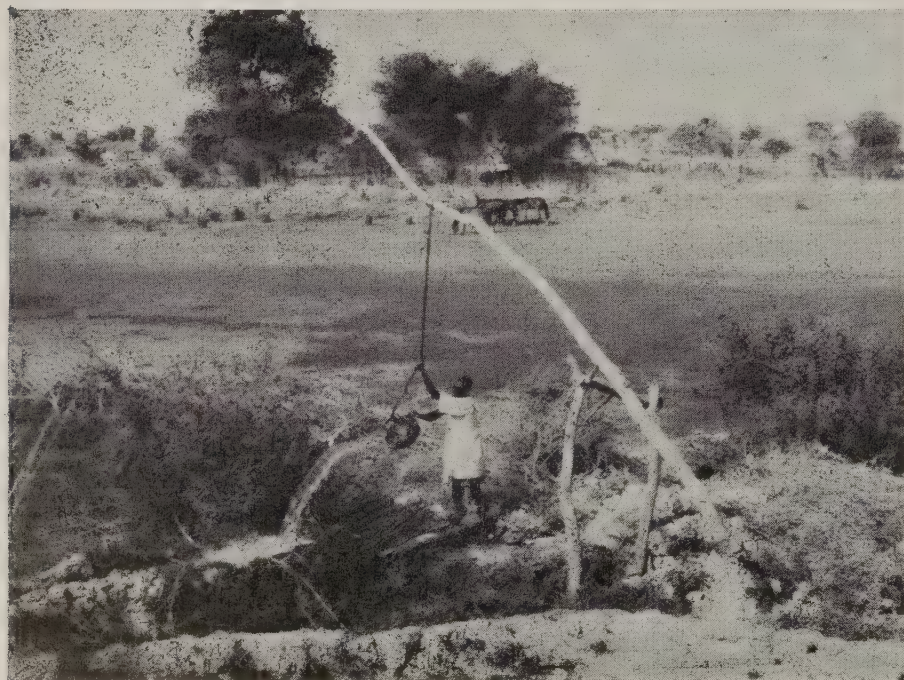
In summary, the principal agricultural needs of the Hausa farmer are for:

- (1) Better supply of water for people, animals, and irrigation.
- (2) Hand tools and animal-drawn tools.
- (3) Knowledge of how to conserve and properly use their limited soil, water, and plant resources.
- (4) Help in learning about improved methods of crop production.
- (5) A way to alleviate the conflict between the nomad and farmer.

These are all complex problems, but as one farmer said: "If our problems were simple, we would not be an underdeveloped country."

We were impressed with the willingness of the farmers to help themselves and their desire for people to show them how. ♦

Water is drawn by hand on a Hausa farm in Niger.





Old problems for a modern program . . .

Erosion by wind and water still needs attention in Northeast



In the humid Northeast, an area noted for wooded hills and scenic beauty, there still are cultivated areas where soil erosion calls for action to meet USDA's Agriculture/2000 goal to "upgrade the quality of the environment."

"Achieving erosion control and reducing sediment damage on two-thirds of the privately owned lands

not yet adequately treated" is one of the planks in the Department's platform for Resources in Action.

Although farmers across the Nation have made great strides in reducing erosion, there still are problem areas where losses by wind and water are expensive to farm operators and threaten future productivity.

Wind erosion is a serious problem in several Northeastern areas. In Camden County, N. J., for example, 5,000 acres of Downer, Westphalia, and Freehold soils are subject to wind erosion. These soils are permeable and easily worked after a rain. They warm up early in spring, so they are good for raising sweet corn. But even a light spring wind can whip the fine sands around, cutting off



A spring duststorm (upper) in New Jersey reduces visibility and sandblasts tender asparagus into grotesque and unmarketable shapes. Several inches of sediment (lower) at lower edge of potato field in Maine shows severity of erosion.



young corn plants at ground level.

Wind raises havoc with other young plants, too, on unprotected fields in parts of New Jersey's truck farm area. Asparagus tops, for example, can be sliced off or blown into grotesque and unmarketable shapes.

A farmer in Gloucester County, N. J., loses as much as 50 tons of soil in 2 or 3 days whenever a strong spring wind blows. A privet hedge or other vegetation planted in strips or rows to form a wind-break could help control soil blowing.

Water erosion also continues to be a problem in New Jersey. The Conservation Needs Inventory indicated that of 864,000 acres of cropland expected to be in production in 1975, 251,400 acres will need conservation treatment to control erosion.

Pat Licciardello of Swedesboro was losing 30 tons of topsoil with every heavy rain. But he put a stop to the loss by applying a coordinated conservation plan on his farm in cooperation with the Gloucester County Soil and Water Conservation District. With the help of SCS technicians, he drew up a plan that included 3,000 feet of grassed waterways, 2,000 feet of terraces, and 100 acres of contour planting. With these conservation practices now on the land, erosion has been reduced to a minimum.

In Maine's potato land of the Central Aroostook Soil Conservation District, about 700 farms comprising some 100,000 acres are suffering accelerated sheet erosion. The yearly loss is figured at 18 tons an acre. In some places, where potatoes have been grown on sloping land without the protection of conservation measures, all the topsoil has been washed away, leaving the subsoil exposed.

The effects of neglecting conservation show dramatically in the tobacco-growing area of Prince Georges Soil Conservation District, Md. On 50 percent of the tobacco land, the yearly soil loss runs between 8 and 25 tons an acre. On 20 percent of the land, the loss exceeds 25 and sometimes even 100 tons an acre. ♦



Erosion leaves a Maryland tobacco field (upper) scored with rills and exposes roots of young tobacco plant. A single thunderstorm cut a gully (lower) through a Maine potato field just after planting when the soil was bare and loose.

Land treatment in Texas watersheds gives far-reaching benefits

By William L. Smith

Conservation agronomist, SCS, Temple, Tex.

Treatment of critically eroded areas in Texas watersheds produces long-term benefits and serves a double conservation purpose. It boosts farm income through more efficient use of land and protects downstream water resources and flood-plain property.

Not only do critically gullied areas face destruction themselves, but they produce damaging runoff and sediment. Control of most critical areas is beyond the scope of the individual landowner. On-site benefits alone do not often warrant the cost of treatment. Benefits must come from downstream protection.

For example, 98 million tons of silt are delivered annually to the streams of Texas from agricultural land. A major part of this comes from critical areas in the upper reaches of the watersheds.

Three USDA programs, Watershed Protection and Flood Prevention under Public Law 566, Great Plains Conservation Program, and the Agricultural Conservation Program, help accelerate efforts to treat these areas.

Clear Creek watershed

Clear Creek, a subwatershed of the Trinity River Flood Prevention Project located near Montague, and Choctaw Creek Watershed Project in Grayson County, Tex., are two examples of watersheds where critical area treatment plays a vital part in watershed protection. The upper 18 percent of the watershed lies in the West Cross Timbers Land Resource Area underlain by poorly consolidated sand that is easily eroded. Before treatment, the critical sediment-

source areas in this watershed had an annual erosion rate of about 6.65 acre-feet per square mile.

To protect a system of 52 flood-water-retarding structures, 14 critically gullied areas were treated. Two grade stabilization structures, 3.55 miles of diversions, 1.25 miles of terraces, and 13 sediment-control structures were built and vegetated. This work was in addition to regular conservation measures installed by landowners.

Fourteen critically gullied areas, a total of 372 acres, were sloped, plowed, fertilized, mulched, and seeded to adapted grasses. They were also fenced so the grass could be managed properly.

The project was sponsored by the Upper Elm-Red and Denton-Wise soil and water conservation districts, by Denton, Montague, and Cooke counties, and by the Clear Creek Watershed Authority.

The watershed authority obtained easements and land rights. The Soil Conservation Service furnished technical assistance and the cost of establishing works of improvement. Sponsors are responsible for operation and maintenance of the project.

Cost-sharing program

The 14 areas treated as a part of this project are only a few of those in the watershed needing treatment. Others are being treated by landowners under the Great Plains Conservation Program, with SCS furnishing technical help and about 80 percent of installation costs.

Most critical areas treated under the Great Plains Program are sloped, plowed, fertilized, and planted to adapted grasses—main-

During heavy rains such critically gullied areas as this one in the Clear Creek watershed dump tons of eroded material, too sterile to be called soil, on valuable downstream bottom land.





A critical sediment-source area in Choctaw Creek watershed before treatment (left) and after shaping and sodding with coastal bermudagrass. Note the same tree in upper right-hand corner of each picture.

ly hybrid bermudagrass. Grade-stabilization dams are built as needed to control overfalls. In the Clear Creek watershed, 140 acres of critically gullied areas and 1,857 acres of less severely eroded land have already been planned and are being treated under this program.

To aid the Choctaw Creek Watershed Project, the Grayson County ASCS Committee approved a special practice under the Agricultural Conservation Program to treat 134 acres of severely gullied land and 3,000 acres of other eroded areas. The sediment control will help protect 34 flood-water-retarding structures, seven multiple-purpose dams, and 20 miles of stream channel improvement.

Under the ACP practice, landowners receive increased payment for sloping, preparing seedbed, fertilizing, and planting grass on the designated areas. SCS furnishes technical assistance for planning and installing the practice. About 400 acres were treated in 1967.

Benefits from watershed projects are far reaching. For example, the annual cost of \$314,164 for structural measures in the Choctaw watershed is expected to

produce annual benefits of \$427,109—a 1.3 to 1 ratio. For the Clear Creek Project the benefit-cost ratio is 1.5 to 1. ♦

Rural families benefit from poverty loans

More than 23,000 of the Nation's rural families isolated in poverty were given a chance to break their economic barriers with economic opportunity loans in fiscal 1967, through the lending program administered by the Farmers Home Administration for the Office of Economic Opportunity.

The past fiscal year, ending June 30, saw 16,453 loans totaling \$28,159,747 made to individual rural families in the lowest income group to provide tools, supplies, and working space they need in order to earn a better living.

Another 7,200 families, members of rural cooperatives, benefited from the 382 loans advanced to groups in fiscal 1967 by the Farmers Home Administration. Loans totaling \$4,086,382 were used to develop new cooperatives or improve existing organizations ranging in membership from three to 1,136 families.

Since start of the EO loan pro-

gram in January 1965, more than \$74 million in individual loans has gone to 44,000 rural families, and more than \$9.7 million in group loans has been advanced to 827 cooperatives involving about 13,074 rural families.

The individual economic opportunity loan borrowers are following about 350 different kinds of nonagricultural enterprises in addition to farming, as a result of the helping hand extended them through the program. Individual loans average \$1,711 a family, with a maximum of \$3,500 in effect.

Under the program, cooperatives, unlike individual families, are not limited in the amount of financial assistance they receive. In fiscal 1967 group loans averaged \$10,697. Through the cooperatives, low-income people gain the use of equipment or other facilities they cannot afford individually. ♦

Soil conservation districts

Each soil and water conservation district is autonomous and self-governed. It has authority to enter into working agreements with other governmental agencies and with private concerns to carry out its purposes. ♦



Japanese Scouts fly their colorful pennants.

On the wooded shores of beautiful Lake Pend Orielle in northern Idaho, Boy Scouts and scouters from 103 nations gathered August 1 to 9 for the Twelfth Boy Scout World Jamboree—the first ever held in the United States and the first one at which conservation activities and programs were an integral part of the daily schedule. Host for the international event was the Boy Scouts of America.

To many of the 12,000-plus Scouts at Farragut State Park, conservation was a new word. Learning about the need for and the principles of conserving natural resources in all parts of the world was an exciting new adventure on the frontiers of knowledge.

The friendship theme

“For Friendship” was the overall theme of the Jamboree, and under this banner Scouts learned not only about the relationships among natural resources but also of the interdependence among nations with regard to proper use and care of resources.

More than 50 private, State, and Federal resource agencies and organizations sponsored exhibits and demonstrations in the Jamboree conservation area.

Duplicate basic instruction

Conservation

—in your hands

World Scout Jamboree introduces boys to natural resources on SCS teaching trail and at other agency exhibits

areas, each with four stations featuring different resources—geology and soil, water, plants, and wildlife—were cooperatively developed by several State and Federal agencies.

At the first station, a 4-foot-deep soil pit was dug to show Scouts the appearance of soil where they stood. To show the kind of soil that developed under different conditions, a soil monolith from nearby Bernard Peak was displayed near the pit.

Specially trained technicians from the agencies, including the Soil Conservation Service and the Forest Service, gave prepared lectures and answered questions for troops of Scouts during hour-long sessions in the basic instruction area. This was one of many activities Scouts could participate in to earn the coveted Adventure Award badge given at the Jamboree.

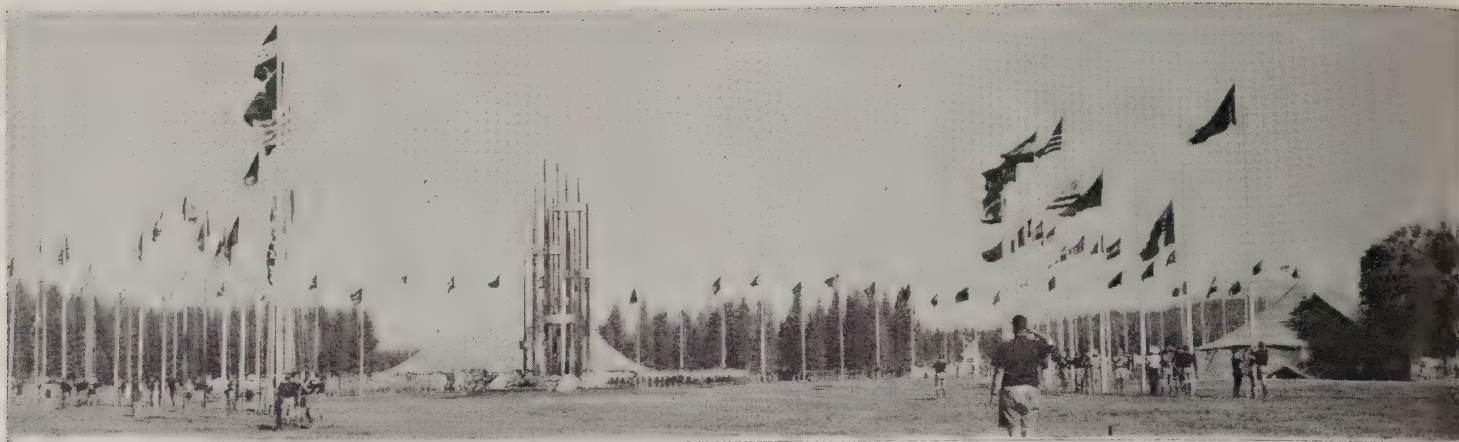
At the conservation fair

In a separate “Conservation Fair” area, a broad array of displays and demonstrations helped to show that the welfare of the whole human family and of all life on earth depends in large measure on proper use and care of the world’s natural resources.

Along the “Conservation—In Your Hands” trail developed by

International exchange at the totem pole.





the Soil Conservation Service, Scouts first were introduced to the beauty of the American countryside and to different conservation practices by a display of "America The Beautiful" color pictures. Next, they learned how soils developed under desert, prairie, and woodlands differ. Here they viewed seven soil monoliths from various parts of the United States, illustrating soils similar to those of their own countries.

Do-it-yourself soil profiles

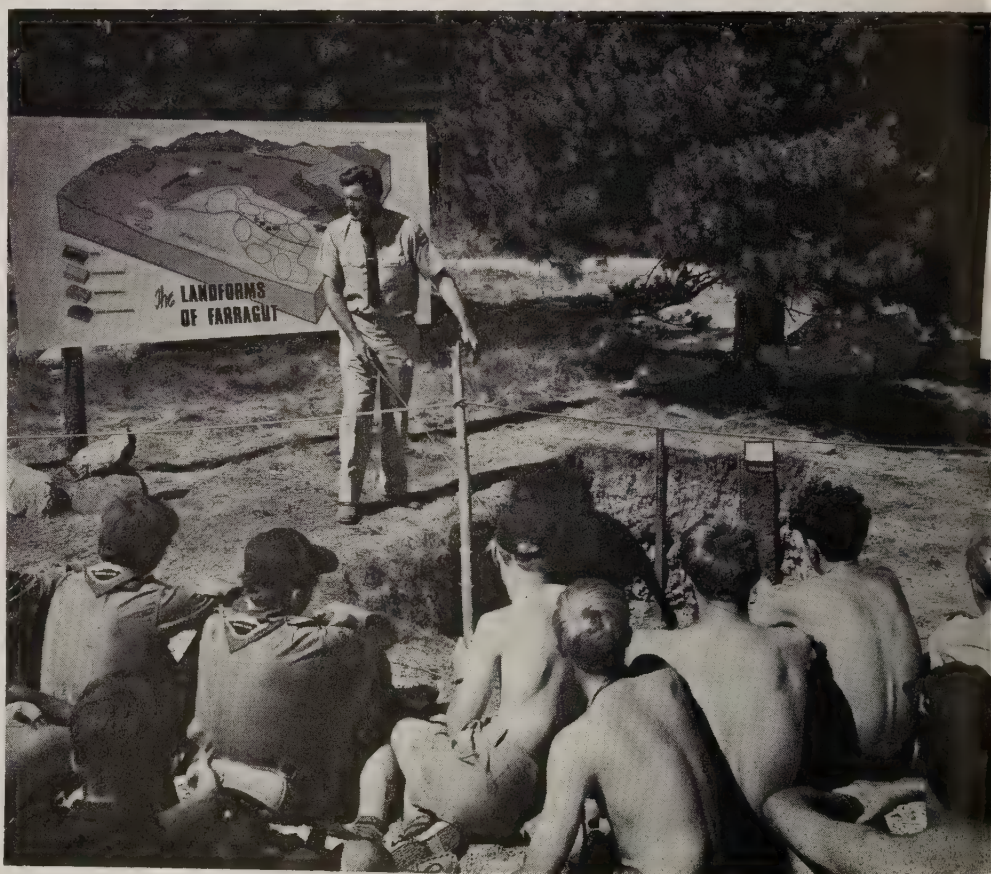
To help remind them of their visit to the United States and of the importance of soil to their lives, Scouts were given an opportunity to make their own "ersatz" soil profiles from supplies of mudstone, decomposed granite, clay, and surface soil.

The 5,500 Scouts who made profiles carried away a half-ton of northern Idaho soil that was sterilized, sealed in 1-inch diameter plastic tubes, and labeled so they could be taken through customs.

At the runoff-erosion control station, the value of plant cover and mulches in preventing wind and water erosion was demonstrated. Scouts saw water run off bare ground carrying surface soil with it and causing gully and sheet erosion. They learned about damage to water quality as the muddy water ran into glass containers and the sediment settled to the bottom.

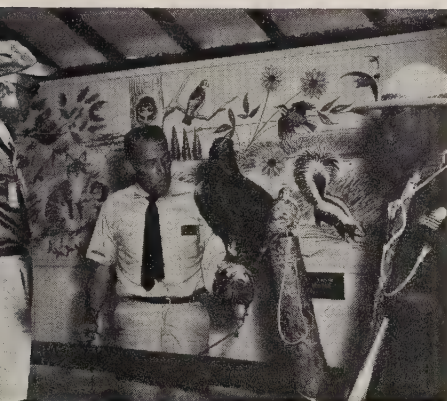
On adjacent demonstrations

Hoisting of flags of more than 100 nations (above) around Friendship Tower opened each day's activities at the World Jamboree. Miniature soil profiles assembled in plastic tubes by Scouts as part of their instruction on soil conservation were popular souvenirs of the Jamboree. At right, Irving Feist (center), international commissioner, BSA, and Alden G. Barber, chief Scout executive, receive their samples from Mel Carlson, SCS woodland conservationist for Idaho. At another station (below) SCS conservationist Van Haderlie, Helena, Mont., explains soil characteristics exhibited by an open pit and soil monoliths.





The SCS exhibit of the major plant communities of northern Idaho (above) provides a quiet place for rest at the end of the trail. Morlan Nelson (left), SCS snow survey supervisor for Idaho, displays his golden eagle and sparrow hawk (on post). SCS Conservationist Daniel Moore (below) of Meridian, Idaho, explains the erosion and runoff exhibit to Assistant Secretary of Agriculture John A. Baker as he welcomes him with the traditional Boy Scout handshake. Also seeing the exhibit are Ed Cliff (far right) chief of the Forest service, and Neal Rahm, regional forester of Missoula, Mont.



they saw grass cover and plant material mulches prevent splash erosion, help water soak into the soil rapidly, and control soil erosion so the water that did run off was clear.

Farther along the trail were

automatic electronic models of two watersheds—one demonstrating the destructive effects of uncontrolled water and lack of conservation practices, the other showing the benefits to all residents of the watershed of proper land treatment

and use of appropriate water-control structures.

It was here that the relationships among resources were tied together, and the Scouts learned that conservation management of watersheds reduces the threat of floods, protects soil and water resources, gives opportunities for developing recreation areas around impoundments, improves wildlife habitat, and provides communities with water supplies for industrial, agricultural, and municipal uses.

Wildlife and the land

“Abundant Wildlife—Product of Good Land Management” was the theme of the SCS station at which Scouts saw a demonstration of the art of falconry. While viewing a 35-foot color mural depicting modern conservation practices that benefit wildlife, they learned about the essential needs of wildlife and how good land management provides for these needs.

At a series of six panels developed in cooperation with the University of Idaho, Scouts could study six different plant communities of northern Idaho as they related to a particular kind of soil.

Sixteen SCS professional conservationists from seven States and Washington, D. C., helped conduct the demonstrations and tours. Two were interpreters in Spanish and French.

As they journeyed to their homes in many lands after the 9-day Jamboree, most Scouts took with them a new understanding of the world around them and of the importance of using natural resources wisely. They also gained appreciation of the role they must assume in helping to arouse the interest of their friends and neighbors to learn more about and to practice conservation.

And many Scout leaders, including the chief Scout officials of several nations, returned to their jobs inspired to make conservation an important part of the Scouting program in their countries. ♦



Outdoor Code



Order of the Arrow Scouts study and practice conservation

As an American, I will do my best to - - -

BE CLEAN IN MY OUTDOOR MANNERS. I will treat the outdoors as a heritage to be improved for our greater enjoyment. I will keep my trash and garbage out of America's waters, fields, woods, and roadways.

BE CAREFUL WITH FIRE. I will prevent wildfire. I will build my fire in a safe place and be sure it is out before I leave.

BE CONSIDERATE IN THE OUTDOORS. I will treat public and private property with respect. I will remember that use of the outdoors is a privilege I can lose by abuse.

BE CONSERVATION-MINDED. I will learn how to practice good conservation of soil, waters, forests, minerals, grasslands, and wildlife; and I will urge others to do the same. I will use sportsman-like methods in all my outdoor activities.

"I will learn how to practice good conservation of soil, waters, forests, minerals, grasslands, and wildlife; and I will urge others to do the same."

This is part of the Outdoor Code to which about 4,500 boys pledged renewed dedication in August at the 52d conference of the Order of the Arrow, Boy Scouts of America.

An elite camping and conservation fraternity within the Boy Scout organization, Order of the Arrow members are elected by others in their local troop, on the basis of exceptional skills in camping, conservation, and outdoor life. There are a quarter million of these young men in 512 lodges in 200 Scout councils in the United States.

At their national conference, held this year on the University of Nebraska campus in Lincoln, many special exhibits on conservation were arranged by public agencies and private organizations.

An exhibit placed by the Soil Conservation Service was titled "Patterns on the Plains."

Holt County Soil and Water Conservation District of Nebraska prepared a panel of native grass specimens on which Scouts could practice identification with a push-button-lights device.

Explorer Scouts of Post 501, which is sponsored by the Lincoln Chapter of the Soil Conservation Society of America, distributed copies of the SCSA publication, "The Story of Land—Its Use and Misuse Through the Centuries and Today," at their booth.

Most Order of the Arrow members have had experience in local conservation projects that give them an opportunity to practice their skills while making their community a better place to live.

In Georgia, the Flint River Council brought a conservation message to about 20,000 people through exhibits at seven county fairs.

OA Scouts in the Denver Area Council planted 6,000 trees at 10 sites in the Jefferson County School District in Colorado.

Erosion-control work and beautification projects on an 88-mile stretch of expressway served as a conservation project for Atlantic City, N. J., Council, while nearly 5,000 Scouts in Buffalo, N. Y., completed 2 hours of conservation work each.

In Utah, Scouts planted bitterbrush for mule deer food as a wildlife conservation project in reclaiming 32 acres of burned-over rangeland near Salt Lake City.

Last year's tornado damage to Central Park in Topeka, Kans., provided an opportunity for the Jayhawk Area Council to contribute about 25,000 Scout-hours of rehabilitation and conservation work. ♦

Scouts exhibited their camping, lifesaving, and conservation skills in "county-fair" fashion on the campus of University of Nebraska at the 52d annual conference of the Order of the Arrow.



In the early 1930's Illinois conservation leaders saw the need for a tree nursery that would enable landowners to translate their newly awakened conservation interests into deeds.

The State of Illinois established the Mason State Tree Nursery 9 miles east of Havana to produce planting stock for erosion-control and reforestation where plants otherwise would not be available.

Since the mid-thirties the Mason Nursery has produced trees and shrubs at the rate of 5 to 10 million plants a year. The nursery has also developed new plants which later found their way into commercial channels.

"That's 5,000 to 10,000 acres of new tree plantings from this one nursery each year," says Hugh Wycoff, nursery superintendent. "They protect eroded land, make a better home for wildlife, and beautify the rural landscape in Illinois' 100 soil and water conservation districts."

Originally, 80 acres of land was purchased by the State for the nursery operation—50 acres for tree production and 30 acres for permanent shelterbelts, small forest plantings, beautification plantings, wildlife habitat, buildings and roads.

In the beginning, supervision and labor were supplied by the Emergency Conservation Work Program and the Civilian Conservation Corps. Later the Soil Conservation Service provided technical assistance and supervision for the nursery program. In 1937 the Illinois Division of Forestry assumed full responsibility for the operation.

Soil and water problems

The nursery officials soon saw that they had soil and water problems just as other rural landowners do. In 1949, Superintendent Wycoff requested help from the Soil Conservation Service on complete conservation plan including the needed drainage ditches to

Nursery has long history of growing trees for conservation planting

By Ray Lane

Work unit conservationist, SCS, Havana, Ill.

remove surface water from the fields.

Since seedling trees must have optimum soil moisture, a water-supply system for irrigation was also established. The nursery is fortunate in having 26 feet of combined water depth above bedrock, which averages about 150 feet below the surface. By 1955, sprinkler systems were adequate to reach all 50 acres of the fields that produce nursery stock.

The need for other conservation measures, such as: fertilizing, mulching, green manure crops, cover crops, weed control, and insect control, was also clear. Green manure is provided by growing sudangrass on about one-third of the plots each year. Generally, this crop will produce about 20 tons of green manure a year. In addition, about 500 cubic feet of sawdust is applied to increase organic material in the soil.

Nitrogen in large quantities is required to bring about decay of the sawdust and sudangrass. Sawdust is also applied to the beds to keep small trees from freezing and to eliminate weed growth. Sawdust reduces evaporation and retards wind erosion.

A conservation example

In addition to producing trees and other woody plants for farm plantings, the Mason Nursery provides examples of conservation on its own land. Natural beauty is seen in its many rows of spirea and arborvitae. Shelterbelts of pine, spruce, fir, osage orange, and redcedar offer an outstanding example of wind-erosion control and add their bit to rural beauty in the community. Autumn olive and Amur honeysuckle are grown for their wildlife benefits.

These trees and shrubs also provide nesting sites for songbirds.

A crew lifts shrub stock for wildlife plantings as Manager Wycoff watches.





Nursery Manager Hugh B. Wycoff with a package of 1,000 small pine trees ready for shipment.

Mourning doves are increasing in the vicinity for this reason. The pines and other trees and shrubs serve as temporary living quarters for migrating birds. Owls that occasionally migrate here in severe weather make their temporary homes in the nursery. Crossbills and other species also stop in from time to time.

The Mason Nursery continues to fill a unique role in producing nursery plants for conservation purposes. Demands change but are never satisfied, as more and more people find new ways to protect and beautify the Illinois countryside. ♦

Soil in irrigation planning

Soil is the foundation on which a conservation irrigation system must be built. It must be irrigable; that is, capable of sustaining yields high enough to pay the costs of development plus those of farming operations and maintenance. A farmer must be able to get a profit from irrigation without soil deterioration.

New RC&D projects are approved for planning in 18 States

Fifteen new Resource Conservation and Development projects covering more than 40 million acres in 18 States have been approved for USDA planning assistance. Two of them, one in Alabama and one in Virginia and West Virginia, have also been authorized for operations.

Forty-one RC&D projects including nearly 100 million acres have been approved for planning assistance or operations since the program was launched in 1964.

The projects are intended to help broaden soil and water conservation district programs, speed up the small watershed program and encourage multipurpose resource use, develop recreation on public and private lands, beautify the countryside, and create better rural facilities to attract new industry.

Following are the newly designated projects:

The Wiregrass Project, including nine counties in southeast Alabama, will concentrate on erosion and sediment control, restoration of strip-mined areas, and water-resource management. Other improvements include better housing, sanitary and health facilities.

The Mountain-Dominion Area Project in five counties of Virginia and West Virginia is designed to improve water-resource management, increase employment opportunities, and carry out other comprehensive plans to upgrade the area's economy.

The North Cal-Neva Project in northeastern California and northwestern Nevada hopes to strengthen the family farm and halt an outflow of the area's population through mineral and forest resource development and improvement and promotion of tour-

ist and recreation facilities.

The Eastern Connecticut Project will combine municipal, regional, and State planning to coordinate land, water, and other resource developments for agricultural, industrial, and urban uses in an 870,000-acre area.

The Georgia Ochopee River Project, covering Treutlen, Wheeler, and Montgomery counties, calls for watershed and public recreation developments, and accelerated technical assistance to speed up land treatment, complete soil surveys, and deal with roadside erosion.

The East Central Minnesota Project of four counties is designed to develop markets for woodland products and specialty crops, and to plan and zone lands, lakes, and streams for more efficient use, at the same time preserving their natural beauty and preventing overcrowding and pollution.

The Northeast Mississippi Project includes plans to reduce flood damages in its 19-county area, increase agricultural efficiency through conservation, development, and proper use of farmland, and to develop woodlands for timber production, recreation, and wildlife habitats.

The Southwest Missouri Project aims to develop soil, water, and plant resources according to an overall plan for the 10-county area. Sponsors believe higher incomes and better living conditions will result from cooperation of agencies, groups, and individuals in the plan.

The North Country New Hampshire Project is expected to increase opportunities for young people and year-around employment for all ages, promote

efficient dairy and crop production, expand industrial and forest production, and develop fish and wildlife areas in Carroll, Coos, and Grafton counties.

The Southwestern New York Project intends to organize land-use developments around community-oriented goals, including commercial recreation, to attract revenue and make better use of existing resources in the counties of Chautauqua, Catteraugus, and Allegany.

The North Central Piedmont Area Project in North Carolina is expected to develop water resources to serve water needs for the six counties, reduce soil erosion and siltation, make land use adjustments, and improve educational and other facilities for better rural and urban living.

The Buckeye Hills Project of five counties in Ohio will set out to provide employment for local people, improve health and other facilities, reduce pollution, prevent floods, increase recreation opportunities, and develop other natural resource-based programs.

The Northeastern Pennsylvania Project, including five counties in the Appalachian Region, will emphasize a stabilized economic development of the area, increased public recreation opportunities, land use planning, and improved woodland management.

The Eastern Hill Country Area Project in Texas, covering the counties of Gillespie, Blanco, and part of Llano, is expected to reduce flood damages, develop mineral resources for industrial use, preserve historical sites and wildlife areas, and improve rangeland management.

The Western Wyoming Project covers all of Lincoln and Uinta counties in Wyoming and part of Caribou County in Idaho. The sponsors hope to increase control over water release from snowmelt, increase farm and ranch efficiency, and improve recreation facilities.

28 RC&D projects now in operation

Recent authorization of operations in eight additional RC&D projects brings to 28 the number actively installing planned project measures. Thirteen others are in the planning stage.

Two projects were authorized for operations only weeks after approval for planning assistance. They are the Wiregrass Project in southeast Alabama and the Mountain-Dominion Area Project in Virginia and West Virginia.

Newly authorized projects include the South Central New York Project, Lowcountry Project in southeastern South Carolina, Bossier and Webster Parishes Project in Louisiana, Box Elder Project in northwestern Utah, Shawnee Project in 14 counties of southern Illinois, and the Southeast Texas Project.

The previously authorized Bon Homme-Charles Mix Project in southeastern South Dakota was enlarged by adding Douglass County. The name was changed to Randall RC&D Project. ♦

Summer home for junior ranchers

Conservation, cattle, and kids are big in the Milhous scheme of things.

Oliver and Frances Milhous have raised their 19 foster children, plus two sons of their own, on their 700-acre ranch 11 miles north of Nevada City, Calif.

Now, they are operating a vacation farm equipped to handle 80 boys and girls, ages 7 through 17, who gather eggs, milk cows, bottle-feed lambs, and care for other livestock during 2-week sessions.

When they moved to the ranch in 1951, Milhous signed up as a cooperator with the Nevada County Soil Conservation District, adopted a conservation plan, and rented a portable saw mill through the district.

They built their own home and out-buildings from home-sawed lumber, cleared the brush on their Sierra Nevada ranch, and carried out the conservation plan.

Milhous cleared about 300 acres of brush, improved timber stands, built seven farm ponds, and developed springs to supplement the ponds and provide domestic and irrigation water supplies. Now, once-dry creek beds run year-round, and Milhous markets continual harvests of lumber and firewood.

"I am not as much interested in making a profit as I am in making a place for children to enjoy," Milhous said.

The ranch has 80 head of cattle, 40 horses, 24 burros for pack trips, sheep, goats, pigs, chickens, ducks, geese, peacocks, pigeons, and guinea hens.

Care of the animals, including a captive bobcat and ringtailed cat, is a must on the young guests' daily schedule.

But it's not all work. Between ranch chores, there are plunges into the "ole swimming hole" in nearby Yuba River; fishing or boating on the seven manmade lakes; midnight 'coon hunts; horseback riding; camp-outs; and delicious home-cooked food.

Counselors instruct guests in horsemanship, woodsmanship, swimming, lifeguarding, fishing, hunting and hunter safety, tracking, arts and crafts, nature studies, and sports coaching.

Wildlife—deer, racoon, bobcat, quail, and mallard duck—provide additional outdoor education and enjoyment.

"Children can see fancy buildings, concrete slabs, and pavement in the city," Milhous says. "When they come here, we provide an outdoor atmosphere where they can get a real feeling of ranch life. They learn while doing it." —RAY BORCHARD, *work unit conservationist, SCS, Grass Valley, Calif.* ♦

To fetch a pail of water

For 40 years Johnnie Welch and his family trudged up the hill and down again to fetch a pail of water.

The family's only source of water is a spring located at the top of a hill 600 feet away and 20 feet above the house. Many trips for water had to be made each day.

"That hill seemed to get higher as I grew older," Mr. Welch said. "And after my children grew up and left home, the chore was all mine."

W. T. Brown, SCS work unit conservationist, helped Welch develop a soil and water conservation plan for his 80-acre farm near Mt. Vernon in the Mobile County Soil Conservation District, Ala. Brown told Welch of a seep spring development that would apply the principle of letting water run downhill to the house. It would be simple, cheap, and dependable.

In this case the simple things in



Two grandsons, Ralph Laffitte (left) and Larry Granger, watch their grandfather, Johnnie Welch, dip the final pail of water from the old spring.

life weren't exactly free, but they were certainly inexpensive. Welch already had a sack of cement, some short pieces of pipe, and a 24-inch culvert to use as a spring box. All he had to buy was 600 feet of plastic hose at a cost of about \$50.

When the work was completed, William, his son recently back from the Army, held a bucket under the pipe in the front yard and caught the first water as it flowed down the hill from the spring.

Another part of the conserva-

tion plan was to clear a 25-acre blackjack oak and palmetto hillside. A loan from Farmers Home Administration and cost-share payments from the Agricultural Stabilization and Conservation Service enabled him to plant the hillside to Pensacola bahiagrass.

"Before I planted grass," Welch said, "that land couldn't support a gopher, much less pay taxes." Now the bahiagrass is off to a good start, and soon he will be able to increase his herd. ♦

Welch looks on as his son William catches the first bucketful of water to come downhill by gravity flow. Later the pipe was buried and attached to the kitchen sink, and Mrs. Welch sees the result of the seep spring development. "Just think, no one had to go after it," she said. Now all she has to do is turn it on.



A rancher makes a choice . . .

Controlled burning and reseeding restore big sagebrush range

By Claude C. Dillon

Range conservationist, SCS, Spokane, Wash.

Rancher-farmer Scott Barr of Edwall, Wash., had a choice to make.

He could see that big sagebrush was taking over his range, especially one pasture that had been heavily overgrazed by work horses in the years before tractor farming.

He knew that there are several ways to get rid of brush: spraying with chemicals from air or ground; railing or chaining; cutting or beating; plowing or harrowing; or, maybe, burning.

But which would be best for *his* pastures?

Barr discussed brush-control methods with Len Dompier, SCS work unit conservationist serving the Davenport-Reardan Soil and Water Conservation District, with which Barr is a cooperator.

They considered what species of brush were present, what forage plants were under the brush, and whether seeding following control would be necessary to re-

establish desirable bluebunch wheatgrass and Idaho fescue.

The alternatives

They concluded that the rangeland was too irregular and stony for use of ground equipment for chemical spraying. Aerial spraying would kill any desirable broadleaved plants that might be present, as well as the brush.

Since big sagebrush was the only brush species present and it is easily killed by fire, Barr finally decided to burn—deliberately and carefully.

If there had been threetipped sagebrush, rabbitbrush, or gray horsebrush, burning would not have been practical because these species sprout back after fire and may become even more abundant than before.

Barr and Dompier considered the small population of sage grouse, which used the pasture. It was determined that the same kind of



Rancher Scott Barr (left) reviews his ranch plan on the ground with SCS Soil Conservationist Dompier as they plan ways to speed range recovery after burning an area of big sagebrush.

Big sagebrush was so dense on Scott Barr's range (left, below) that little grass grew. Three years after controlled burning and seeding, Soil Conservationist Dompier (left) and Barr admire the grass.



habitat was present around the proposed burn area so that the grouse would not suffer.

About 300 acres of the area to be burned had very few desirable forage species. There, seeding would be necessary if perennial grasses were to be established. The other 50 acres had a fair amount of bluebunch wheatgrass and Idaho fescue under the dense sagebrush, so this portion would not need reseeding.

Fire—effective but dangerous

Fire is one of the oldest, most widely adapted, and least expensive methods of controlling sagebrush. It is also the most frequently misused. Barr planned his controlled burning of big sagebrush carefully.

First, he checked with the local fire control organizations for their cooperation and guidance. They issued him a fire permit.

Second, he decided to burn in the fall, when burning would be least harmful to wildlife. At that time, the young of the year would be mature enough to find food and cover in adjacent areas and adjust to new surroundings before winter set in.

Grazing was deferred during the spring and summer of 1963, permitting a maximum of annual grass and weed growth to carry a fire. This also provided improved root vigor of desirable perennial bunchgrasses.

Firebreaks were constructed around the area with a bulldozer, baring a strip 10 feet wide.

In mid-September, the area was fired from the firebreaks toward the center. The afternoon was warm and there was a mild wind. A man on a tractor with a high pressure weed sprayer filled with water followed the workman setting the fire to quickly put out sparks outside the firebreaks.

As soon as the fire was out and the ashes cold, an airplane was hired to broadcast seed—a mixture of Nordan crested wheatgrass,

intermediate wheatgrass, Sherman Greenar big bluegrass, and Durar hard fescue—at about 10 pounds of total seed per acre. A good stand of these grasses was established in the deep soil areas where ashes were abundant. The 50 acres which had a fair stand of bunchgrasses was not seeded. The natural stand of bunchgrasses is improving.

Agricultural Conservation Program incentive cost-sharing payments were helpful for the purchase of seed as well as for the cost of hiring the plane to broadcast it.

Workshops for high school students

More than 500 Illinois high school students attended sixteen 5-day conservation workshops this summer. The sessions, sponsored by five Illinois universities, dealt with soil, water, forest, fish, mineral, and game resources.

Most of the students attended on full-expense scholarships provided by soil and water conservation districts, women's clubs, sportsmen's clubs, garden clubs, civic clubs, FFA chapters, the Izaak Walton League, and the Audubon Society. Scholarships ranged from \$40 to \$50 covering tuition, room, meals, instructional aids, and field trips.

Southern Illinois University sponsored nine workshops at Little Grassy Lake. The outdoor education center near Carbondale gives the university a 1,100-acre outdoor laboratory. Little Grassy Lake was built in 1942 with technical assistance from the Soil Conservation Service.

Northern Illinois University, Western Illinois University, and the University of Illinois each sponsored two workshops, and Illinois State University conducted one.

Robert M. Ring, director of the Illinois Division of Conservation Education at Springfield, says the

The total pasture was rested from grazing until the fall of 1965 when it was grazed lightly. It was deferred again in the spring of 1966 and moderately grazed in the fall. Scott Barr put this pasture back to full use in his system of rotation-deferred grazing last spring when cattle grazed it from April 15 to May 15. He plans to leave about 50 percent of the total growth of the bunchgrasses when grazing is completed in the fall.

So far Barr is pleased with the results. He says, "The water that big sagebrush was using is now growing lots of grass." ♦

workshops encourage students to pursue careers in fields of conservation and resource management. Lectures and seminars are supplemented with movies, demonstrations, and field trips. SCS personnel and other Federal and State conservationists participate in the workshops, but most of the teaching is done by university instructors.

Illinois soil and water conservation districts sponsored 76 students and furnished conservation portfolios prepared by the Soil Conservation Society of America to all students who attended. Hillard Morris, president of the Illinois Association of Soil and Water Conservation Districts, encourages their participation.

"With many of our young people growing up amid skyscrapers and concrete playgrounds, we must train specialists to educate our citizens of the need to conserve our countryside," he says. "Summer workshops have provided the kick-off for several conservation careers. We hope to see more in the future."

The universities in Illinois also cooperate with the Office of Public Instruction to offer credit and non-credit conservation workshops for teachers. ♦

Food problems are topic for soil and crop scientists

Three professional organizations of soil and crop scientists will meet jointly in Washington, D.C., November 5 to 10. They are the Soil Science Society of America, the American Society of Agronomy, and the Crop Science Society of America.

The principal theme of the meetings this year is "Food for Billions."

There will be about 350 papers dealing with soils and an equal number concerned with crops. Some 50 papers will deal with soil genesis and classification.

A special feature of this year's program of interest to soil scientists is a soil-geomorphology tour in the vicinity of Raleigh, N.C. It will be held November 4 and 5, the 2 days preceding the meetings in Washington.

Recent research findings in the relationships of soil morphology and geomorphology on the Coastal Plain will be demonstrated. These findings are thought to be of particular interest to the classification and utilization of soils in many developing countries, as well as the Southern States. Those interested in the tour should write to Professor R. J. McCracken, head, Soil Science Department, University of North Carolina at Raleigh.

State universities and Land Grant colleges

The general sessions of the annual convention of the National Association of State Universities and Land-Grant colleges are being held November 14-15 in Columbus, Ohio.

The president of the association, James H. Jensen of Oregon State University, will deliver the principal address. Dr. Champion Ward of the Ford Foundation,

Dr. Paul Miller, assistant secretary of the Department of Health, Education, and Welfare, and Senator Wayne Morris of Oregon are other speakers at the general session.

The meetings on November 12 and 13 are mostly closed.

Dates and places

November 5-10, American Society of Agronomy, Washington, D. C.

5-10, Soil Science Society of America, Washington, D. C.

5-10, Crop Science Society of America, Washington, D. C.

12-15, National Association of State Universities and Land Grant Colleges, Columbus, Ohio

December

3-7, National Recreation and Parks Association, Miami Beach, Fla.

6-8, Western Forestry and Conservation Association, Seattle, Wash.

11-14, American Farm Bureau Federation, Chicago, Ill.

12-15, American Society of Agricultural Engineers, Detroit, Mich.

26-30, American Association for the Advancement of Science, New York, N.Y.

Recreation boom

Americans spend more than \$20 billion a year for outdoor recreation. By 1980, they'll spend an estimated \$46.6 billion. USDA estimates the recreation boom will create 200,000 new full-time jobs in our small cities and open countryside by 1980.

A survey of people who borrowed money from USDA to start outdoor recreation businesses shows the average income from multiple recreation facilities was \$4,400. ♦



New publications

Roughness Characteristics of Natural Channels. BY HARRY H. BARNES, JR. 1967. *U. S. Geol. Surv. Water-Supply Paper 1849.* 213 pp., illus. Beautifully colored photographs and information on the geometry and roughness characteristics of 50 different stream channels. The 50 sites include a wide range of hydraulic conditions from the boulder-strewn mountain stream of the western United States to the heavily vegetated flat-sloped stream of the southern region. Sand-channel streams are not a part of this report because roughness coefficients for streams of this type have already been defined in terms of size of bed material and other variables. The States involved are Washington, Ohio, Texas, Montana, Oregon, New York, Nebraska, Idaho, New Mexico, Arizona, Georgia, Illinois, Wyoming, Utah, Kentucky, North Carolina, Colorado, California, and Massachusetts.

Landscape Evolution and Soil Formation in Southwestern Iowa. BY ROBERT V. RUHE AND JOHN G. CADY. 1967. *USDA Tech. Bul. 1349.* 242 pp., illus., with folded map in pocket. In four parts; chapter 1 discusses the relationships of Pleistocene geology, geomorphology, and soils in southwestern Iowa; chapter 2 the areal relationships of the Pleistocene geology, and geomorphology in parts of Adair County; chapter 3 soils of parts of the Greenfield quadrangle; and chapter 4 the methodology of the soil-geomorphologic studies of the Greenfield quadrangle applied to a small watershed. The report is an evaluation of landscape evolution and soil formation in a humid temperate region, the result of a project of SCS Soil Survey Investigations.

Recreation Land Price Escalation. BY BUREAU OF OUTDOOR RECREATION. 1967. *U.S. Dept. Int.* 33 pp., illus. A report on the problem commonly facing agencies responsible for land acquisition as a result of price increases between authorization or announcement of projects and time of purchase.

Geomorphic Surfaces and Surficial Deposits in Southern New Mexico. BY ROBERT V. RUHE. 1967. *New Mex. Institute of Mining and Technology Memoir 18.* 66 pp., illus., with folded map in pocket. A report on a coordinated study

area in New Mexico that began in 1957. Objectives of the original study were to delineate the kinds of landforms and soils in the area and to determine the nature of their origin within the physiographic history of the region.

Suggested Guide for Weed Control 1967. BY CROPS RESEARCH DIVISION, AGRICULTURAL RESEARCH SERVICE. 1967. *U. S. Dept. of Agr. Hbk. 332.* 64 pp. \$0.40. An up-to-date handbook of methods of weed control—physical, biological, and chemical—covering general principles and specific recommendations for different types of crops and other cultivated plants. The booklet includes a table of chemical, physical, and biological properties of herbicides.

A Critical Index of Films and Filmstrips in Conservation. COMPILED AND EDITED BY THE AUDIO-VISUAL CENTER, THE CONSERVATION FOUNDATION. 1967. 3d ed. *O'Hare Books, Flanders, N. J.* 79 pp. \$1. Deals with renewable and nonrenewable resources, resources and people, and ecology.

Equipment for Applying Soil Pesticides. BY O. K. HEDDEN, J. J. WILSON, AND J. P. SLEESMAN. 1967. *USDA Agr. Hbk. 297.* 36 pp., illus. \$0.20. Slightly revised; first issued 1966.

Water and America's Future. (1967). *Soil Conservation Society of America, Ankeny, Iowa.* 239 pp. \$5.00. Proceedings of the 21st annual meeting at Albuquerque, N. Mex., August 1966.

The Hired Farm Working Force of 1965. BY GLADYS K. BOWLES. 1966. *USDA Agr. Econ. Rpt. 98.* 29 pp. A statistical report.

Soil surveys

Comanche County, Oklahoma. BY HUBERT L. MOBLEY AND R. C. BRINLEE. 1967. 58 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Houston and Peach Counties, Georgia. BY JOHN C. WOODS. 1967. 73 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by John C. Woods, J. O. Murphy, and T. A. Rigdon.

Gwinnett County, Georgia. BY RAY J. TATE. 1967. 94 pp., illus.; maps 4 inches to the mile (1:15,840).

Delta-Montrose Area, Colorado. BY A. J. CLINE, CLAYTON SPEARS, FORREST MEHAFFEY, EDWIN KUBIN, RICHARD FRANKLIN, AND CARL PACHEK. 1967. 73 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by E. W. Knobel, Rey Decker, and Donald McMahon.

Zuni Mountain Area, New Mexico. BY JOHN A. WILLIAMS. 1967. 86 pp., illus.; maps 2 inches to the mile (1:31,680). Soils surveyed by John A. Williams, Truman C. Anderson, Jr., Darwin B. Crezee, and Basil Abraskin.

Tehama County, California. BY K. D. GOWANS. 1967. 124 pp., illus.; maps 2 inches to the mile (1:31,680). Fieldwork by K. K. Gowans, J. M. Crawford, J. I. Mallory, O. C. Olson, J. DeLapp, and F. Smith.

Farmsize efficiencies

Economic Research Service of USDA reports that three studies showed 1-man farms were capable of achieving average costs as low as any larger size. In the production of cling peaches in California, average cost was found to be a minimum as orchard size reached 90 to 110 acres—basically a 1-man operation—when mechanized practices were used. The utmost efficiency was attained by a highly mechanized 440-acre irrigated cotton farm in Texas and a 1,600-acre wheat-summer fallow farm in Oregon. ♦

USDA resource conservation

A large part of the land and water resources of the United States are privately owned and operated under the laws of the 50 States. USDA has the major responsibility for cooperative programs with the States to conserve, develop, and manage soil, water, grass, forest, and wildlife habitat on private lands. These programs include research, education, extension, technical, credit, and financial assistance. On the National Forests and National Grasslands, USDA administers a multipurpose program of resource management. ♦

Conservation irrigation

Conservation irrigation is the use of irrigated soils and irrigation water in a way that insures high production without wasting either water or soil. It means using cropping, irrigation, and cultural practices that maintain the land in permanent agriculture. ♦

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Maine

USDA SOIL CONSERVATION SERVICE
CONSERVATION FARMING SYSTEMS CROSS FARM BOUNDARIES, CENTRAL AROOSTOOK
SOIL AND WATER CONSERVATION DISTRICT

Full-color lithograph prints suitable for framing—one for each State, Puerto Rico and Virgin Islands—are available from the Superintendent of Documents for 10 cents each or \$5.00 for set of 52. Obtain order blanks from your local SCS or postoffice.

From the Administrator:

Erosion Control and Agriculture/2000



- *Achieving erosion control and reducing sediment damage on the two-third of the privately owned lands not yet adequately treated.*
- *Eliminating sediment pollution from all streams and reservoirs, and from all National Forest lands.*

These two goals among those listed in *Resources in Action: Agriculture/2000* as the current expression of the policies and programs of the Department of Agriculture tell us that the original mission of the Soil Conservation Service has not been abandoned, however much it has been broadened to include new responsibilities.

Our continuing concern with new aspects of resource conservation—development of outdoor recreation, enhancement of natural beauty, economic development of rural communities, and other important problems in the use and management of land and water resources—could without proper understanding cause responsible landowners and conservationists to lose sight of the fundamental problem of soil erosion.

This is likely to be especially true in agricultural areas where aggressive action by soil conservation districts has made real progress in altering patterns of land use and reducing erosion damages. Satisfaction with success sometimes dims awareness of failure and oversights.

But the job of erosion control has not been completed, and the need for it has not disappeared. The

Conservation Needs Inventory revealed that two-thirds of the non-Federal rural land still needs soil and water conservation treatment of some kind. The seriousness of this need is recognized by the task force that formulated the Department's statement on Resources in Action.

Significantly, the new blueprint of USDA action does not set up erosion control as an objective to be sought for its own sake. It is, rather, a means of implementing stated policies to attain objectives of broad economic and social significance.

The goal of "achieving erosion control . . . on . . . land not yet adequately treated," for example, is one of six ways the Department proposes to accomplish its first objective for Resources in Action; namely, to *Upgrade the quality of the environment*. The others are:

"Extending erosion control, landscaping, and enhancement of natural beauty as standards in the construction and maintenance of all roads and highways.

"Accelerating research that will help achieve specific reductions in air and water pollution.

"Making technical services and guidelines available to county and municipal governments to aid in proper site selection and erosion control in suburban construction.

"Helping to rehabilitate old strip-mine scars and establishing conservation and land-restoration practices as standards in surface operations.

"Modifying, where necessary, resource use to prevent impairment of environment."

Thus, erosion control is seen in perspective as a necessary part of a broader objective concerned with the quality of the total environment.

Likewise, "eliminating sediment pollution from all streams and reservoirs . . ." is a goal in implementing policies to attain the objective to *Help find solutions to America's water problems*.

Again, erosion control is recognized as a part of the program to *Strengthen the economy and standards of living in rural America*. One of the goals in implementing policies to this end is "Getting resource conservation firmly recognized and used as the cornerstone of rural community development."

Another is "Completing treatment and shaping of all the land suited for crops to reduce soil and water losses and accommodate modern machinery."

It is clear, then, that the stability of the soil in place—i.e., control of erosion—is an essential condition to the efficient use of resources and the conservation of man's total environment as envisioned for Agriculture/2000.

As soil conservationists become active in the service of urban and suburban land planners and builders, we see some of the same urgent concern over erosion and zeal for its control that fired the attack on "the menace of soil erosion" on the farmland of the Nation a generation ago.

Such spirited reaction to a problem newly recognized is natural. It is a mistake to let it be dimmed by familiarity, or lost in the pursuit of new interests.

Soil conservation today means many things unthought of in the early days of the Soil Conservation Service, but it still means, among all the others, keeping the soil in place and in productive condition under agricultural or nonagricultural uses to meet human needs.

D. A. WILLIAMS

If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

District cooperators start plan at 104 years

When Melquiades Ortiz recently signed up, at 104 years, as cooperator with the Grant Soil and Water Conservation District in southwest New Mexico, he became top contender for the title of oldest known conservation district cooperator.

He is still an active farmer, with help from his children and his faithful work mare "Dolly," and produces grain, alfalfa, and apples. He intends to carry out a conservation plan on his farm in the Mimbres Valley.

Three years ago, at the age of 101, Ortiz joined his community in signing up for a 5-year community group enterprise plan to completely rehabilitate the San Lorenzo Community Irrigation System.

The project diverts water from the Mimbres River to irrigate orchards and cropland.

The system includes a major diversion dam, ditch lining, pipeline, flume and siphon, and irrigation water-control structures. It is now three-fourths completed, and Ortiz looks forward to seeing it finished within a year.

He was brought as a child 102 years ago to the dry, invigorating climate of the Mimbres Valley from where he was born in a small village south of Casa Grande in Chihuahua, Mexico. This was less than 10 years after the U.S. Government purchased the land from Mexico, and several years after it became the Territory of New



Melquiades Ortiz, an immigrant from Mexico 102 years ago, plans for the future on his New Mexico farm.

Mexico.

Ortiz recalls from his childhood the large herds of cattle driven up from Mexico to graze in the color-

ful valley during the summer, and he remembers bands of Apache Indians traveling the mountains of New Mexico. ♦

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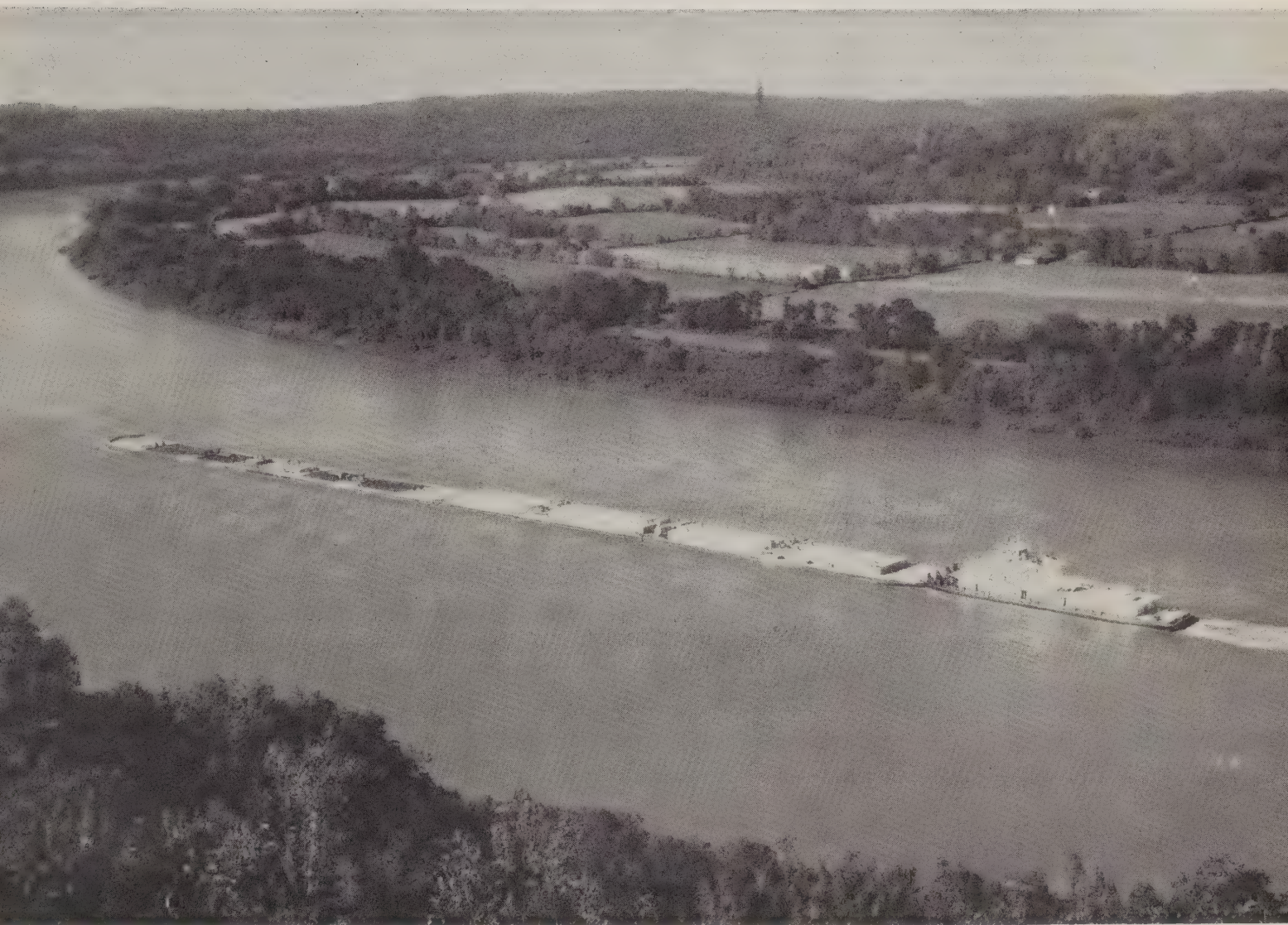
DECEMBER 1967

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

/ Straton
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Abbott
G. Smith
Stewart
McBee
Harner
Gehrt



THE LINCOLN HILLS RC&D PROJECT

A report in depth on the Nation's first Resource Conservation
and Development Project

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: The land that Lincoln knew—the low hills and the wide sweep of the Ohio River as seen from "Artist's Point" near Fredonia in Crawford County, Ind.

Renaissance . . .

What Secretary Freeman found when he visited the Lincoln Hills in Indiana on his "see and hear" tour last summer (*Soil Conservation*, Sept., p. 36) must have confirmed his conviction that rural renaissance through resource conservation and development is possible and practical.

Since that time he has urged such revitalization of rural areas as an answer to the problems of rural urban imbalance with increasing emphasis.

And what our information man, Joe Larson, learned while helping make advance arrangements for the Secretary's tour in the area convinced us that this is a story more people should know about.

The obvious rejuvenation of community spirit and economic life in the four-county area since the Secretary gave it the go-ahead as the Nation's first operating RC&D Project 4 years ago is an example of what is going on in the forty other RC&D areas.

We asked State Conservationist Tom Evans to let the local people, inside and outside SCS, tell about their own varied activities in this coordinated community development. Larson and Information Specialist Kent Alverson from Lincoln helped put this exceptional series of articles together.

The bylines in this issue are a cross-section, but not a complete roster, of the official and private groups contributing to the success of the Lincoln Hills Project.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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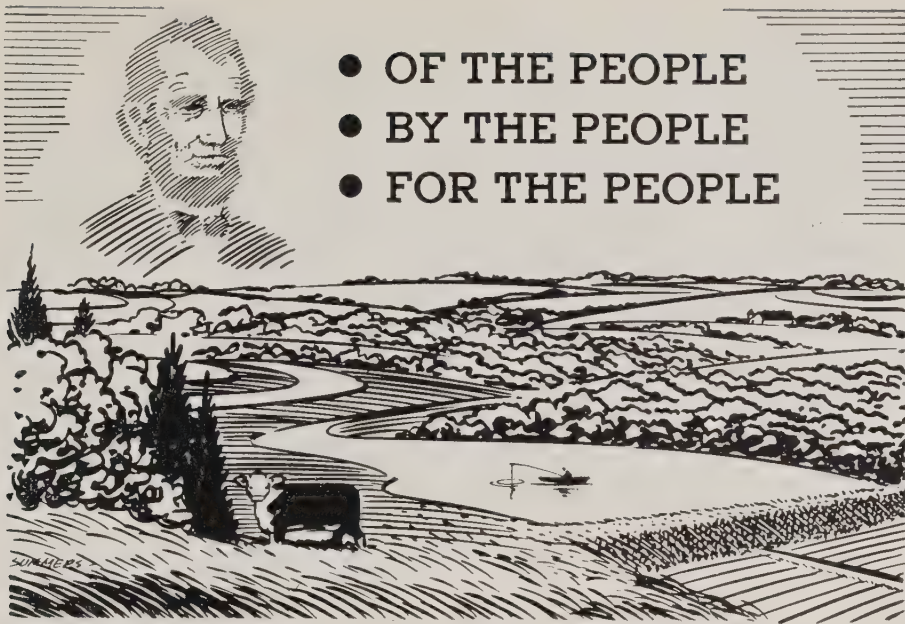
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A catalyst for community action . . .

The Lincoln Hills RC&D Project

By Howard W. Busch and Edgar F. Braun

SCS assistant State conservationist in Indiana and first chairman of the Lincoln Hills RC&D Committee

“**H**ere I grew up,” Abraham Lincoln once said proudly of that section of southern Indiana, now known as Lincoln Hills, where he lived from 7 to 21 years of age. Here he worked the land, split rails, and shared the hard work every pioneer family knew.

Lincoln would indeed be proud today of the people who are developing this area of 1,005,440 acres bordering the Ohio River in Spencer, Perry, Crawford, and Harrison counties.

Determined to overcome rural economic problems, the leaders of Lincoln Hills look with confidence to the years ahead. Their optimism springs from the Lincoln Hills Resource Conservation and Development Project—from its success in harnessing local leadership efforts to upgrade the economy through conserving and developing soil, water, forest, and wildlife resources.

But, success in getting everyone

to pull together did not come quickly or easily.

Cooperation on a multicounty basis began when Rural Area Development (RAD) committees from the four counties joined together to promote tourism and attract attention to the scenic and historic Lincoln Hills area.

Hours spent working together on public information leaflets, days spent manning a booth at the State fair, and weeks of joint planning for a Lincoln Hills scenic drive provided opportunities to share common problems and plan the improvement of their four-county area. A milestone was reached in 1963 when an act of the Indiana State Legislature officially recognized the four counties as the “Lincoln Hills.”

The Food and Agriculture Act of 1962 offered Federal impetus to cooperative development. With help from the RAD committees,

the four soil and water conservation districts that comprise the area acted promptly to sponsor an application for an RC&D Project.

In May of 1963, when Secretary of Agriculture Orville L. Freeman visited the area, he announced the acceptance of their application as “first in the Nation.” After funds were appropriated, assistance provided, and a project plan developed, the Lincoln Hills RC&D Project became operational in October of 1964.

A 16-member Lincoln Hills RC&D Committee has equal representation from the conservation districts and the RAD committees of the four counties involved.

The RC&D Committee, in its overall capacity, makes full use of subcommittees to pursue individual projects and activities in resource development. The Livestock-Forage, Forestry, Fish and Wildlife, and Scenic Drive subcommit-



With his auger, SCS Soil Scientist John M. Robbins, Jr., unlocks soil secrets to answer questions on land use and treatment for agricultural and other developments.

tees are typical of those with special objectives in a particular area of interest.

Essential to the success of the Lincoln Hills RC&D Project is the active participation of many people with different backgrounds who represent the interests of the 61,000 people in the four-county community. The conservation district supervisors represent the farm background while several businessmen, two bankers, a county judge, clergymen, an artist, county commissioners, newspaper editors, sportsmen, and respected civic leaders represent other interests. The RC&D Project has become a catalyst to forge this wide cross section of backgrounds together for the overall improvement of the entire area.

The need for action is evident. Soil erosion has taken its toll; woodlands are of generally low quality; and water resources have not been developed. All too many acres of pasture have gone unimproved.

Recognizing the need for detailed soils information in the orderly development of the area, the project sponsors asked for and received SCS assistance to speed up soil surveys. To date more than 86 percent of the project's million-acre area has been mapped, and reports have been prepared for two of the counties.

The use of soils information is not limited to conservation planning. Special soils reports, with interpretative information, have been developed for the Spencer County industrial park and the Harrison County development areas. Information from the soil surveys is proving to be a valuable asset in the development of the Lincoln Hills.

In the past year, 328 farmers and other landowners became co-operators with their conservation districts, a 64 percent increase over the preproject rate. In tune with the acceleration of conservation work, these and other concerned

people are producing new reforested lands, improved woodlands, better pastures, and new multiple-purpose water developments to add prosperity to the Lincoln Hills' scenic and historic qualities.

Leaders of the RC&D Project are finding that solid and lasting accomplishments take time, require the patient involvement of many people, and, at times, a firm position on an issue. At times there are objections to be overcome and money is short, but progress is being made.

In Perry County a new high school has replaced an outmoded wooden structure.

In Crawford County the creation of modern medical and dental clinical facilities, through public subscription, was possible only because of the downright hard work, perseverance, and sacrifice of many people.

The people of Crawford still haven't found but continue the search for help they need to explore the extent and quality of an industrial gypsum supply known to exist there.

Several agencies of Federal and State governments have given help to local leaders. SCS has Federal leadership in the project with help

The Lincoln Hills RC&D Committee reserves to members the privilege of disagreeing and debating vigorously during discussion periods but also stipulates that they must be in agreement before the meeting is adjourned.





Fine homes and well-kept farmsteads, like this one in the Middle Fork of Anderson watershed, are the harbinger of a new prosperity coming to Lincoln Hills through resource development.

from other USDA agencies. The Department of the Interior and the Office of Economic Opportunity also contribute.

On the State level, the Indiana Department of Natural Resources and the Cooperative Extension Service of Purdue University lend further confidence and support to Lincoln Hills. The State Government has just completed two modern bridges across the Ohio River at Cannelton and Mauckport that will connect with a planned highway to make Lincoln Hills easily accessible from all directions. The State also loaned \$100,000 from an industrial revolving fund for an industrial park development in Spencer County.

The full economic impact of the Lincoln Hills RC&D Project will not be known for some time, but some results can be measured.

Recent studies indicate an annual increase of 11.4 percent in average weekly employment, 8.7 percent in average weekly wages, and 13.3 percent in total payroll earnings.

Nine banks and four farm equipment dealers reported that their businesses are at an all time high.

The numbers and value of livestock sold have increased.

Eight weekly newspapers pub-

lished in the area claim circulation higher than ever before.

Toward self-improvement

By W. Dean Jones and Mrs. Edna Eastridge

Director and assistant director, Community Action Agency, Tell City, Ind.

Among programs available from the Office of Economic Opportunity for families and individuals with low incomes in the Lincoln Hills, several are underway through the Community Action Agency.

Operation Mainstream has provided employment for 108 men, many of whom are more than 60 years of age. These elder citizens brushed and seeded 200 miles of roadside to reduce silt-producing erosion and make the area more attractive. Eighteen have better jobs as a result of this employment opportunity.

The Family Management Project, cosponsored by Purdue University, is designed to work with the economic and social problems of low income rural families. Counseling services and homemaking are offered, and 235 families have been helped. Much of the project's success is due to 12 local aides

The number of visits to recreational sites is rising sharply.

Probably the most appropriate summary of progress was given by the Secretary of Agriculture when he revisited the area earlier this year:

"It is evident throughout these four counties that teamwork between the people and their local, State, Federal governments can accomplish great things. You are moving ahead on a multicounty approach. You are dealing with local resource problems on a unified basis rather than dealing with one resource, or one use, or one purpose. You are accomplishing this through the Lincoln Hills Resource Conservation and Development Project." ♦

trained by two professionals to work in their own county.

The Neighborhood Youth Corps was created to help economically deprived youth, age 16 to 22, to stay in school by enabling them to work during their school years. The Corps also permits youths to return to school or go into advanced training to better qualify themselves for permanent jobs. The staff and nine part-time counselors have acquired work stations for 200 enrollees in nonprofit organizations.

In its second year, Headstart, an 8-week summer project for preschoolage children, has 18 youngsters enrolled. Under the guidance of trained teachers, volunteer parents, and other workers, it has attracted communitywide support. Conducted at Hoosier Heights School in Tell City, this activity also provides a nourishing noon-day meal to those enrolled. ♦

What'll we do today? . . .

Lincoln Hills outdoor recreation facilities offer user many choices

By David Click and Willis Ridenour

Indiana State forester and work unit conservationist, SCS, Cannelton, Ind.

How about going on a picnic and a stroll through the woods? And don't forget the fishing rod—the fish might be biting if it's too chilly for a swim. But the campout, the cave tour, and the canoe trip will have to wait; we can't take it all in at once.

The recreation complex taking form in Lincoln Hills will soon be forcing recreation enthusiasts to make these decisions.

Greater impetus to recreation development stems from the Middle Fork of Anderson Watershed Project in the center of the four-county area. Saddle Lake is one of four multipurpose dams in the project and the first to be completed.

Monument to cooperation

At the dedication in July, Karl Gayer, chairman of Middle Fork Watershed Conservancy District, said, "This lake with its facilities is the first milestone and is a monument to the local people cooperating with the Soil Conservation Service and the Forest Serv-

ice. We are also indebted to the Branchville Job Corps for their efforts in developing the recreation facilities."

Perry County Park and Recreation Board and the State of Indiana also plan a 327-acre recreational development in the main Anderson River watershed.

In the western part of Lincoln Hills, Santa Claus Land, Inc., a private multimillion dollar recreational development, when completed, will be one of the largest of its kind in the Midwest. A camping area will soon be supplemented by Christmas Lake Village and an 18-hole golf course.

On the eastern border, in the Big Indian Creek watershed, the Floyd County Park and Recreation Board, the State of Indiana, and SCS are working jointly on a wide range of recreational facilities featuring a 1,000-acre lake.

Also under consideration are a private 400-acre lake along Buck Creek and the Buffalo Trace County Park.

Eventually 25,000 acres, containing the Wyandotte Cave, the Little Wyandotte Cave, and the Harrison-Crawford Forest, will be developed in Crawford County. The complex, to be developed by the Indiana Department of Natural Resources, will embrace both banks of Blue River and offer canoeing on one of the few unspoiled rivers in eastern America.

In the north, the Army Corps of Engineers plans to build an 8,600-acre Patoka Reservoir. In the south, a scenic parkway will give a long look at the beautiful Ohio River while the Cannelton Locks and Dam on the river when completed will round out the RC&D recreation complex with the Ohio Lake.

A hunter's paradise

On top of the wide variety of game found throughout the Lincoln Hills, the Mogan Ridge turkey management area of 5,700 acres under supervision of the Forest Service will help give sportsmen a hunting paradise.

In the center, in the west, east, north, and south, local people's efforts in cooperation with many private, State, and Federal agencies are providing a real economic uplift to the area as it beckons outdoor recreation enthusiasts from near and far. ♦

Many wildlife ponds have been built in the Lincoln Hills area with ACP cost-sharing and SCS technical assistance. And a fish is a fish to youngsters helping with a fishpond management demonstration.





Nearly 700 persons saw this demonstration of modern logging equipment (above). Demand still exceeds the supply of sorghum molasses (below) shown in production here by Russell McCallister. He plants 4 acres of cane and produces 90 to 100 gallons of molasses per acre.



Getting industry by really trying

By Raymond J. Schulthise and Sidney L. Liebert

Secretary, Lincoln Hills RC&D Committee, and Perry County Extension agent Cannelton, Ind.

So, you are in a "distressed area." Many counties are.

In the Lincoln Hills, as in other unorganized rural communities, the past 50 years of centralization of industry have taken their toll of country stores, better jobs, risk capital — sometimes even the desire for community development. Over a period of years intense community pride spawned project after project only to have them die on the vine.

The Lincoln Hills RC&D Project has enabled this four-county area to shore up the weaknesses and the hazards of individual effort. The "let's do it together" spirit is putting the ingredients for success into a steadily growing list of adapted local industries.

Numerous project activities cover nearly every facet of development of land, water, trees, recreation, tourist trade, roads, and rural water systems.

One of the most cooperative efforts for local industry has been the Storrs Wood Products Company, Inc., at Evanston, a flake-board plant costing \$4 million.

In this case, one of the Lincoln Hills development corporations was able to put up 10 percent of the cost and the Economic Development Administration 65 percent. The remaining 25 percent was provided by the Southern Indiana Rural Electric Cooperative, five banks, and two savings and loans associations.

Just getting into operation, the plant employs 70 persons and uses 70 tons daily of pulpwood supplied by area landowners. Besides using inferior wood available in large quantities, it gives employment to another 300 persons working in the woods.

The Eddystone Manufacturing Corporation in English came as a result of the loss of another major industry. The Small Business Administration was consulted, and it was agreed they would assist if a suitable industry could be found to use the vacant plant.

Local business people went to work. They found the right industry. It manufactures wooden desks, and employs 65 persons at the plant. An expansion is now underway.

To provide the right setting and services for industry, a 3,000-acre industrial park has now been established near Grandview in Spencer County. The Soil Conservation Service checked on natural hazards and opportunities through its soil survey. Zoned to remain industrial, this level tract already has two small industries. Special advantages to prospects are its access to the Ohio River, a railroad, natural gas, unlimited fresh water and power.

Nurseryman, Inc., a half million dollar plant manufacturing potting soil, was aided by fund raising

of \$12,800 by the local Chamber of Commerce. Local people also raised \$8,000 for the Dale Wood Manufacturing Company.

Other new industries acquired by cost-sharing processes include Sharer, Inc., a metal fabricating plant; Grandview Aluminum Products, an aluminum coating plant; and Schwaub Safe, a manufacturer of steel safes.

Besides the new companies, there have been extensive additions to several established woodworking, ceramic, and manufacturing industries.

Diversity is the key to keeping prosperity in the Lincoln Hills, and imaginations are always at work for new angles. Discovery of glass sand deposits, for example, has led to the development of industry supplying raw material for the glass and cosmetic industries.

A significant local accomplishment has been the organizing of arts and crafts associations in the four counties. This group has done much to provide an outlet for small

marketable items for tourism.

Regular yearly events, such as shows and festivals, have drawn an immense amount of interest in locally manufactured arts and crafts items such as pictures and other native products.

This is an important industry and means added income to local artists, handicapped individuals, and retired persons. Weekly classes to help people improve their skills are conducted by staff members from St. Meinrad Abbey.

The effort to acquire industry continues because, just as there is no single cause for poverty, neither is there any single cure. We know the area is poor because there are not enough jobs, and the reason there are not enough jobs is because the area is poor.

Statistics can never indicate the total story of a dynamic community. However, it can be shown by the pride of its people who feel the never ending task of working for increased jobs is worth the effort in the Lincoln Hills. ♦

ACP accelerates land treatment

By Carlton Miles and Mary Eisenmenger

Work unit conservationist, SCS, and office manager, ASCS, Harrison County, Corydon, Ind.

Special funds through the Agricultural Conservation Program, administered by the Agricultural Stabilization and Conservation Service, are accelerating land treatment in the Lincoln Hills Resource Conservation and Development Project in Indiana. Some \$203,979, in addition to the regular ACP funds allotted each year, has been allocated by the Indiana State ASCS Committee to the four counties during the 3 years that the conservation and development project has been in operation.

These special ACP project funds

are allocated to a specified area or for a particular conservation practice to correct a specific problem. With ACP assistance, trees have been planted on strip-mine spoil banks and gullied land to retard erosion; timber stand improvement work has been done to upgrade the quality of forests; woodlands have been fenced to protect them from livestock; pasture seedings have been made to convert cropland to grassland or to improve the cover in existing pastures; and ponds have been constructed for livestock water. Diversions, grassed waterways, drop spillways, and other

erosion-control practices have also been built or applied.

An example of the work being done through a special ACP program in the Lincoln Hills area is the progress being made in three small valleys or watersheds. Boiling Creek, Lincoln Spring, and Depauw Valley drainage areas in Harrison County lie next to one another and include 13,710 acres in 124 farms.

Each of the watersheds has had a problem of flash floods from intense rainstorms that have caused scour and sediment damage, destruction of fences, and damage to private and public roads. Rolling to steep topography unprotected by conservation practices contributed to the problem. Intensive land treatment is planned by the owners with help from the Soil Conservation Service.

The special ACP project will accelerate the land treatment by cost-sharing any of the practices in the ACP handbook up to the maximum Federal cost-share limitation per farm. Also, a higher than normal percent of the cost of some of the erosion-control practices will be borne by the program.

To be eligible, the farmer as a cooperator with the Harrison County Soil and Water Conservation District develops a conservation plan for his farm with SCS assistance. The County ASCS Committee then may offer to share the cost of any conservation practice in the county ACP handbook that is called for in the plan.

Although this project has been in operation only a short time, much progress has been made. Sixty farmers with 9,134 acres (66 percent of the area) are cooperators with the district and are applying conservation practices on their land. ASCS has directed \$43,301 of ACP cost-share assistance to this special project area, and the results can already be observed. ♦

Trees for Lincoln Hills

Everybody pitches in to do the impossible in a community self-help forestry program

By Al G. Dauby and Mitchell G. Hassler

Chairman, Perry County Soil and Water Conservation District and Lincoln Hills RC&D Forestry Committee, and RC&D Project coordinator, SCS, Cannelton, Ind.

"I'm a busy man but I'll attend one more meeting to see what this is all about," said Chris Leiber, secretary of the Lincoln Hills RC&D Forestry Committee, during its first session in November 1964.

This was the feeling of other forestry committee members representing the four-county Lincoln Hills Resource Conservation and Development Project area. He and they did attend the second meeting and discovered what they could do by working together. It was all set forth in the project plans.

Staring the committee right in the face were 1,000 acres of gullies in the Middle Fork of Anderson reforestation project measure. It seemed to be an impossible task—to plant 1,000 acres (a million trees) in 5 years in this small watershed area. Nevertheless, a goal to plant 200,000 trees (200 acres) was set for the spring of 1965.

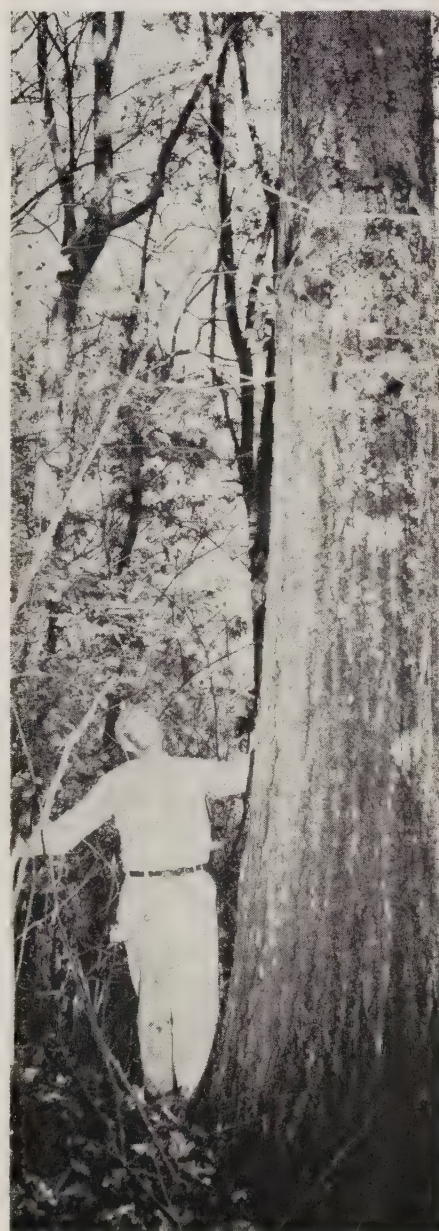
Here is the way it developed. Planting stock was to be made available with RC&D funds to the soil and water conservation districts. They in turn would furnish them free of charge to cooperating landowners. The Agricultural Stabilization and Conservation Service agreed to pay 80 percent of the cost of planting as cost-shares.

The forestry committee knew they had a big job on their hands, so they called two meetings. The first was for planning, and the second was for action.

An "all out" effort was launched with active participation from the following: Local individ-

uals, newspapers, Kiwanis clubs (Cannelton and Tell City), ASCS County and Community commit-

Not many of these giants are left in the Lincoln Hills, but this one illustrates the potential. This red oak will yield 800 board-feet of lumber.





When Storrs Wood Products, Inc., is in full production, it will employ 70 people in the plant making particleboard and 300 to 400 in the woods supplying the raw materials on a part-time basis.

tees, Anderson River Conservancy District, Perry County Soil and Water Conservation District, Division of Forestry of the Indiana Department of Natural Resources, Cooperative Extension Service, and Soil Conservation Service.

A base ownership map of the entire area was prepared with names of landowners having gulied areas needing to be planted. Lists were prepared of these names and given to persons acquainted with the people involved. The County Extension Agent sent two letters explaining the project measure boundaries and benefits to be realized, one letter to local resident owners and the other to absentee landowners. Cannelton and Tell City newspapers printed maps, pictures, and articles promoting the effort. After letters were mailed and articles printed, door to door contacts began.

The results: 302,000 trees actually planted in 1965 through this RC&D community "self help" approach. In 1966, more than 400,000 trees were planted with less effort. Last spring another 200,000 trees were planted, bringing the total to 900,000 trees (900 acres) planted in a concentrated area. In 3 years the seemingly impossible $4\frac{1}{2}$ -year assignment was completed.

Now there are six tree-planting RC&D Project measures being carried out successfully within the four-county area. All are working in a similar manner, drawing upon many sources for assistance. About a million trees and wildlife plants are being established each year. New cooperators are being added by the conservation districts at higher rates than ever before.

Three local commercial tree planting crews have been organized and employ about 40 to 50 persons. Many landowners plant their own trees and wildlife plants during slack season.

Timber stand improvement parties have been successful in getting work started where nothing but good intentions existed before. The TSI party approach allows six to eight landowners to work together. On 1 day they work on one party member's farm and do 10 acres of timber stand improvement. On another day they all go to another member's woods and complete another 10 acres. They continue this until each has completed an equal acreage, then the process starts all over again.

Two new pulpwood using industries, WESCOR Corporation and Storrs Wood Products, Inc., are operating and using raw materials from this area. The forestry committee assisted in setting up pulpwood clinics to inform potential pulpwood producers of income opportunities. Industry representatives attend regular forestry committee meetings and participate.

Two sawmill clinics have been

held with some 100 mill owners, operators, and workers attending each one. All aspects of making a milling operation more economically sound and efficient were presented. Discussion and demonstration topics included log grading, sawing for grade, edging and grading lumber for higher profit, record keeping, and cost accounting.

Lincoln Hills leaders have learned by now never to give up and to look toward all possible sources for assistance. A lumber grading short-course was needed, but there were no instructors available in the Lincoln Hills. Finally, Stem Veneer Company at New Albany agreed to provide an instructor and facilities. Twenty-two persons enrolled for the course, and 21 completed the six evening sessions.

Christmas tree management and marketing demonstrations have been conducted on three occasions. Now a Lincoln Hills Christmas tree growers committee has been formed. It will work toward forming a Christmas tree management and marketing cooperative.

(Continued on p. 114)

A million trees and wildlife shrubs are being planted each year.



Job Corps conservation center gives living and learning experience

By A. Claude Ferguson

Forest supervisor, Hoosier National Forest, Bedford, Ind.

Branhville Job Corps Conservation Center on the Hoosier National Forest in the heart of the Lincoln Hills Resource Conservation and Development Project is operated by the Forest Service in cooperation with the Office of Economic Opportunity.

Branchville has a rated capacity of 112 corpsmen. It is a self-sufficient living-learning center. The conservation center program is designed to meet the needs of boys whom society, the home, local schools, and local communities have failed to serve. Enrollees are characterized as nonreaders, nonwriters, and dropouts.

Published statistics show 65 percent came from homes where the breadwinner is unemployed, 60 percent from substandard housing, and 45 percent from broken homes. Thirty percent cannot read or write above the 5th grade level, and 80 percent had never seen a dentist or doctor before joining Job Corps.

The Job Corps effort, in a period of economic boom, is aimed to give bypassed youth basic education and work experience so that they may join the mainstream of society. Production is a goal but only as a part of the job of helping corpsmen become men.

That Branchville is in the Lincoln Hills is fortunate but no accident. Surveys indicated that real opportunity to combine Forest Service and Job Corps programs for improving human and natural resources existed in the Crawford upland of Perry County, Ind. Resource project opportunities were many and the social and physical

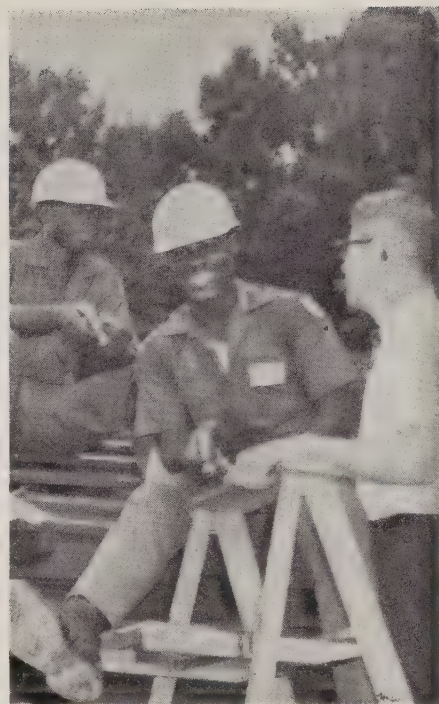
climate excellent. Community acceptance within the area has been "nothing but the best" in Forest Service experience.

The work projects are as varied as the Forest Service multiple-use program. Projects have been completed in recreation, wildlife habitat improvement, timber management, watershed protection, engineering, fire control, and administration improvement. The corpsmen have also added training and improvement projects to facilities at the center.

A few examples demonstrate the scope and variety of the projects. Corpsmen have helped with the Forest Service part of the Middle Fork of the Anderson River Small Watershed Project. They have completed the wildlife and recreation developments at Saddle Lake valued at \$69,500. This work included a campground, picnic area, boat landing, swimming beach, water-supply development, soil stabilization, and fish and wildlife habitat improvement. The recreation area was dedicated by Secretary Freeman on June 29, 1967.

The corpsmen accelerated the Wild Turkey Management Program by installing the Mogan Ridge Turkey Management Area boundary controls well ahead of schedule. A 5-man side-camp at Hardin Ridge Recreation Area on Monroe Reservoir built shelter houses, an entrance gatehouse, and has done extensive water-management and landscaping work.

On-Center learning-improvement projects have included major buildings, sidewalks, landscaping, and recreation improvements. Community projects have included



Job Corpsmen Norris Burdette of East Chicago and Andrew Richardson of Detroit explain their work on a building at the Saddle Lake Recreation Area as the Secretary of Agriculture inspects USDA activities in the Lincoln Hills RC&D Project after dedicating the multipurpose watershed structure.

cleanup of a Civil War cemetery and construction of recreation facilities for public schools.

What of the corpsmen after graduation? A recent survey of 229 Branchville graduates showed the following: 83 boys went to urban centers for advanced specialized training, three took MDTA training courses, and two specialized in heavy equipment training; 12 returned to school and 36 went into service (over a dozen are in Vietnam); and 93 are working in a wide variety of jobs.

The rewards to those working in the program are many. Many 4-F boys see their aspiration to be accepted for military service fulfilled. Boys averaging \$0.80 an hour before enrollment now average \$1.75 an hour with many of the obstacles to advancement removed. Boys who could not read or write are now writing their own checks and reading and paying their bills. ♦



Soil and water conservation are basis for building rural economy

By Earl Blank and Donald E. Sloan

Chairman, Lincoln Hills RC&D Committee, and work unit conservationist, SCS, English, Ind.

Conservation planning comes first in the conservation, development, and utilization of natural resources.

Accidental or incidental conservation can't be effective. Conservation must be purposely and intentionally planned, scheduled, applied, and maintained to give lasting benefits.

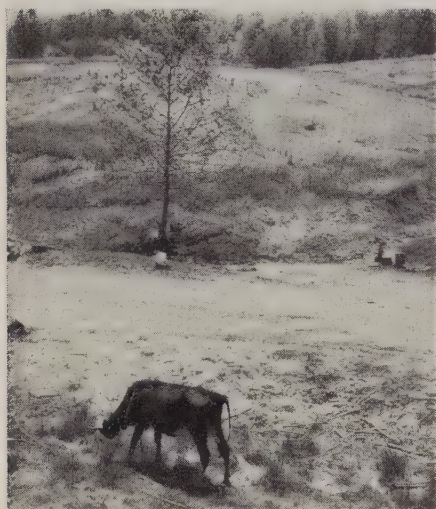
These are the beliefs that guide soil and water conservation district supervisors, RC&D committee members, and allied groups in the Lincoln Hills Resource Conservation and Development Project in southern Indiana.

Conservation planning on Lincoln Hills farms is now at a rate 112 percent greater than before the project was approved. There have been 941 new district cooperators enrolled, 714 conservation plans prepared, and 107 conservation

plans revised since the RC&D Project became operational.

Effective conservation planning results in accelerated application of needed conservation practices. Feasible alternative land uses are determined by a soil survey and inventory of each parcel of rural and urban land. When the choice has been made of how land will be used, needed conservation practices and treatment can also be planned.

Typical of the acceleration in soil and water conservation work is the steady increase in the number of ponds, lakes, and spring developments. The project sponsors agree that water-conservation practices are of the highest priority and have encouraged an increase in grassed waterways, terraces, and diversions. Some 2,150 acres of critical eroding lands have been planted to trees.



Robert Walther (upper left) has built field fences on the contour to make his conservation pattern permanent. Eroded land (above) is being restored at an accelerated rate by conservation district cooperators. Use of family labor (below) makes strawberry profits greater on the Hobart Ingram farm near English.



More grass per acre fed to high quality livestock (upper right) and a new intensive hog-feeding operation (middle right) are among RC&D measures for higher economic returns.

Perhaps the major achievement has been the conversion of marginal cropland and idle land to productive grassland. More than 70,000 acres of pasture and hayland has been established the past few years. The Conservation Needs Inventory showed 102,000 acres of grassland in 1959. The Lincoln Hills conservation needs committees estimated that 152,000 acres would be in grasslands by 1975. It is now thought that the figure will be closer to 280,000 acres.

Purdue University, with local financial assistance, purchased 1,016 acres of idle, eroded Zanesville and Wellston soils in 1953 to conduct research on a grassland-livestock program.

University officials are finding new and economical ways to grow and utilize adaptable forages to support a feeder-livestock economy in southern Indiana. They are very

A water collection system (below) makes clean spring water available on the Kenneth Speedy farm. Perry County Conservation District supervisors (lower right) work together and eat together at their annual meeting and sausage and pancake supper.



optimistic of the future prospects.

Lincoln Hills farmers, in 1959, purchased stock in The Producers Livestock Marketing Association in order to have a marketing facility. The market was built near Milltown in Crawford County. Since 1959, 14,014 feeder calves and 106,511 feeder pigs have sold for \$3,473,350.27 through this market. Plans are now being considered to expand facilities to handle the increasing sales.

Proper forage and livestock management, performance testing to produce faster-gaining cattle, and good markets hold promise of a \$25 million feeder cattle, land-based industry in the Lincoln Hills.

The entire conservation future in the Lincoln Hills looks bright. The local people have charted a sound course, they have developed guidelines and open-end plans, priorities have been assigned, target dates for project measures are set, and schedules have been made to effect a brighter future—economic and social—for the generations to come. ♦

Wide range of water-control measures meets a primary need of RC&D area

By James J. Acres and Joseph W. Wilson

Area conservationist and work unit conservationist, SCS, Paoli and Rockport, Ind.

Small watershed projects and RC&D Project measures, now in various stages of development, when completed will provide flood control and water development for about a third of the million-acre Lincoln Hills area.

One small watershed project under the Watershed Protection and Flood Prevention Act and three water-management project measures being cost-shared with RC&D funds are in active stages of operation or planning.

Two small watershed projects have been approved for Federal assistance in planning. Three other potential small watershed projects and six RC&D water-management measures are in the RC&D Project plan to be considered for activation later.

Construction is already underway in the Middle Fork of Anderson River Watershed Project. Three multipurpose flood-prevention and recreation structures and 5 miles of channel improvement have been completed.

Saddle Lake, the first of a series of multipurpose structures, was dedicated by Secretary of Agriculture Freeman June 29, 1967.

The U.S. Forest Service, with the help of the Branchville Job Corps Conservation Center, completed the recreational facilities and opened Saddle Lake for public use in early July. Recreationists have used the camping, picnicking, beach, swimming, and fishing facilities since the opening day.

One more multipurpose flood-prevention and recreation structure, two single-purpose flood-prevention structures, and 29 miles of channel improvement will complete the structural works of the Middle Fork Project. All the multipurpose structures are on National Forest land. When completed, this watershed will boast one of the finest water-based recreation complexes in the country.

Seventy percent of the needed land-treatment measures has already been applied. For every dollar spent, there will be a return of \$2.30. The project will bring in more than one-half million dollars in benefits annually.

Preliminary plans developed for the Indian Creek watershed indicate that the project, if carried to completion, would bring nearly \$1 million annually in benefits to the community. More than 1,000 acres of the watershed is in Harrison County, a part of the RC&D Pro-

The recreation area at Saddle Lake was a busy place on opening weekend.



ject area. Fourteen of the proposed seventeen structures are multipurpose. Six structures are planned for flood prevention and municipal water supply, seven for flood prevention and recreation, one for flood prevention, recreation, and agricultural water management.

More than \$1½ million (installation cost) of land-treatment practices have already been applied. Parts of this watershed are already "a showcase of land treatment."

The main Anderson River watershed in Perry, Spencer, and Craw-

ford counties has just been approved for Federal assistance in project planning. Preliminary plans submitted in connection with the project application anticipate more than one-half million dollars in benefits annually to the area. It will return \$1.50 for each dollar spent. Land-treatment measures valued at \$1 million, about half the total needed, are already on the land.

Applications on three watersheds—Indian Creek, Little Pigeon River, and North Branch of Little

(Continued on page 120)

Work wanted—not welfare

Ten young handicapped children in Perry County, Ind., have found they have exceptional skills. They are working in a book bindery enterprise designed especially for them—a new local industry called Perry County Industries, Inc.

Going into its third year of operation, the bindery can provide service to libraries, law firms, schools, churches, government agencies, and

other organizations and individuals. Among items turned out was the second printing of the Lincoln Hills RC&D Project plan.

Equipment worth \$6,000 is on indefinite loan from the nearby St. Meinrad Abbey Press. The "indefinite" part is tied into the need for more orders for book binding, says Supervisor Gordon Stirk, Tell City. ♦

Supervisor Gordon Stirk helps handicapped boys learn bookbinding skills.



Loans for water, land improvement, and recreation

By Herman R. Behr

District supervisor, Farmers Home Administration, Corydon, Ind.

In the Lincoln Hills there is a need—an urgent need—for pure water and systems to deliver it to the users.

To overcome this problem, people in the Lincoln Hills joined together to form associations and create rural water systems.

Taking advantage of low-interest loans from the Farmers Home Administration, seven such systems have been installed. They serve more than 1,000 families and eight schools. Another project is under construction, and approval has been given for still two more systems which will serve 350 families and two schools.

The rural waterlines have brought many rural areas back to life. With the water comes new houses, expanded farming operations, a rise in land values, and more jobs.

Systems now planned or installed have a potential of serving more than 3,000 families on their 178 miles of pipelines.

FHA has made loans of RC&D funds in other activities: (1) To the Spencer County Drainage Board \$107,000 for agricultural water-management purposes in the Baker Creek improvement project; and (2) to the Corydon Country Club \$85,000 for expansion of recreational facilities.

As development goes forward the need for advance planning is recognized. Approved grants in three of the counties will permit comprehensive studies of rural land and water-resource needs. To meet these needs, loan funds will play an important part. ♦

Neighborhood group action makes a conservation showcase

Community spirit has led to an 8,000-acre conservation showcase in the Ogle County Soil Conservation District, Ill., with nearly complete conservation applied to land in two subwatersheds on the upper end of Seven Mile Branch.

On 36 farms that received conservation treatment in the past 2 years, landowners completed 97 grassed waterways, 17 miles of tile drain, 16 erosion-control structures, 4 miles of channel improvement, and one flood-retarding dam and lake. In addition, 26 farmers plowed on the contour, and 12 built terraces.

Community cooperation and group planning highlighted the drive throughout. The Agricultural Stabilization and Conservation Service, in fact, made the Seven Mile Creek area a special ACP cost-sharing project because of the demonstrated community spirit. The Soil Conservation Service provided technical service through the conservation district.

Landowners and highway officials cooperated to see that drop inlet structures were installed at bridge abutments, not at fence lines. When a structure was planned at a site where a new bridge was also needed, county officials often shifted priorities so the bridge and structure could be built together. This reduced costs to the landowners involved.

Meeting half way

Highway officials also gave permission for farmers to place tile under roadways provided metal pipe was installed under the road itself. Neighboring farmers joined their tile lines midway to eliminate the cost of an outlet on one side of the road and a surface in-

let to retake the water on the other.

Most of the projects wouldn't have come about without cooperation. For example, one proposed dam would have backed water over a county road culvert. SCS engineers met with Ogle County highway and Buffalo Township officials to explain the problem. The officials decided to spend approximately \$6,000 to raise the culvert 7 feet. In return, they obtained earth for road fill from the lake bed area. The dam also protects highway bridges downstream. And it backs up a 24-acre lake.

Soil from the lake bed was also used to fill an excavated pit on the Polo Community High School grounds. The telephone company relocated an underground cable which would have been submerged.

With so many cooperative efforts, it is hard to name the most outstanding. But to John Conroy, SCS work unit conservationist at Oregon, Ill., group planning and pooling agreements stood out.

Pooling agreements

"Often a grade stabilization structure at the lower end of a channel could stabilize waterways for two, three, or even four farmers upstream," said Conroy. "By planning jointly they could eliminate the need for several structures and all share the cost of just one."

Pooling agreements worked out with ASCS enabled farmers to share the costs among themselves, and to receive ACP cost-shares on a group-plan basis. In all, 11 pooling agreements were signed.

The State ASCS committee made available \$222,585 for conservation work in Ogle County—\$112,585 through regular funds

and \$110,000 extra for the special project in the Seven Mile Creek area.

A preliminary investigation has been made for a possible watershed project under Public Law 566. If the project is approved, more than 60 percent of the needed land treatment will already be applied. ♦

New education center in Louisiana

To meet a pressing need to upgrade educational opportunities, to produce personnel that can meet the requirements of industrial organizations in the region, and to help residents appreciate and understand the natural resources of the area, the North Louisiana Supplementary Education Center was established at Northwestern State College, Natchitoches, La.

The center plans to service 35 school systems in northern Louisiana. It will concentrate on basic educational programs in science, mathematics, conservation, and general analysis of planning for maximal use of educational and human resources.

It particularly aims to develop in citizens of all ages an increased consciousness of the importance of natural resources, and it will attempt to produce a supply of teaching materials designed to assist teachers in correlating the teaching of conservation with various other subject-matter fields in the elementary and high-school curricula. Such material would emphasize concepts of conservation in the proper development, management, and multipurpose utilization of natural resources.

The center, which will have 16 professional employees on its staff, is funded by a grant from the U.S. Office of Education under the Elementary and Secondary Education Act of 1965. ♦

Students like soil monolith tours

By Bruce G. Watson

Assistant State soil scientist, SCS, East Lansing, Mich.

Have you ever taken anyone to the field in quest of miniature soil monoliths? If not, you and those interested in conservation have missed a rewarding and educational experience. One science teacher, who recently attended a soil monolith tour, commented, "This is the first time I have really understood the difference between soils."

During the past summer, science and agriculture teachers, conservationists, county agents, and others participated in soil monolith tours in Michigan. On these tours, usual-

ly arranged by the Soil Conservation Service, each person prepared monoliths of eight of the major soils in the county and by so doing became thoroughly familiar with the soils.

This was the first time many participants had seen the real "business part" of a soil—that is, the part below the surface layer.

Eight sites were selected for each tour. At each site an SCS soil scientist briefly described the nature and limitations of the soil. He passed out a soil interpretation sheet for each soil that further ex-

plained the degree and kind of limitations of the soil for farm and nonfarm uses. By the time the tour ended the people were using and knew the meaning of terms such as "soil structure," "permeability," "drainage," and the like.

Miniature soil profiles are easy to make. First, sample each layer of a soil profile with a special cutter. Cutters of different sizes are used so as to give a sample one-fourth actual size of the layer in the soil. For example, a 3-inch cutter is used to sample a 12-inch layer.

Next, put each sample into a 12-inch long, 2-inch wide, and 1-inch deep wooden tray in the same relative place it occupied in the natural profile. Even though only one-fourth actual size, the finished profile is true to scale.

Finally, pour a clear plastic solution, such as vinylite dissolved in acetone, over the surface of the profile. This solution hardens and cements the soil into the tray. Paint the trays white and you have an attractive model of a soil from your county.

Scale model soil profiles are lightweight and compact and are easier to carry than the full-size profiles. You can arrange the profiles, along with pictures, into a large variety of displays. The soil profiles are good visual aids for teaching, meetings, television programs, fairs, and field days.

"These profiles will sure make teaching about soil resources easier," commented one young science teacher, who later used the soil profiles and the soil interpretation sheets in several classroom exercises. ♦

An SCS soil scientist compares eight soils for these agricultural workers. This group made 48 such soil monoliths of eight different soils in 1 day.



District cooperator boosts income



Tobacco grower Willie Hickman, SCS Conservationist C. D. Boggs, and Assistant County Agent W. P. Johnson (left to right) are reviewing Hickman's farm conservation plan.

Tile drains, installed according to a farm conservation plan, meant the difference between bankruptcy and a profitable farm enterprise for Willie Hickman, a tobacco farmer of the Horry Soil and Water Conservation District in South Carolina.

In 1965 he was on the verge of losing his farm to his creditors. That year he made only 1,400 pounds of tobacco to the acre on his low wet land, although his poundage allotment was 1,819 pounds an acre. His tobacco wasn't bringing in enough money to support his family and meet his obligations.

With the help of the Soil Conservation Service and his district, Mr. Hickman installed 2,000 feet of tile on some of his best land. A loan from the Farmers Home Administration and cost-sharing furnished through the Agricultural Conservation Program paid the bill.

After applying the right amount of fertilizer and potassium sulfate indicated by a soil test, Hickman, in 1966, made 2,700 pounds of tobacco per acre on his improved land. He was one of the few farmers in the county to make his poundage allotment.

Hickman plans to install another 2,000 feet of tile also called for in his conservation plan so he can rotate his tobacco with soil-building crops for better disease control.

Better crops are going to help the Hickman family live better. They are planning to put in a pressure water system for the first time. ♦

Trees

(Continued from p. 106)

The RC&D Forestry Committee also saw need for modernizing old-fashioned, inefficient logging operations. Since practically no modern equipment was working the area, it was necessary to look again for assistance. Nelson Rogers and John Brownell of the U.S. Forest Service came to the Lincoln Hills from Missouri and Illinois over snow-slick roads last winter to discuss opportunities and possibilities for a logging equipment demonstration. After much planning of details and several special meetings, a successful equipment demonstration was held last May.

One equipment dealer has sold four powerful rubber tired "skidders" in the Lincoln Hills. A local

sawmill owner who purchased a skidder said, "This is the first time since I have been in the sawmill business that my logging operation is keeping up with my sawmill."

Forestry operations have extended into highway beautification and erosion control with Kiwanis clubs, Boy Scouts, Girl Scouts, business men, conservation district supervisors, and many others assisting.

Numerous other activities are underway. They include forest fire prevention and suppression, forest resource resurvey, study of a forest classification law, forest management and cooperative marketings, black walnut management and utilization, permanent log grading plots, attraction of more wood-using industries, and maple sirup promotion.

Technical forestry assistance, at present, is the outstanding need, forestry committee members feel. The table shows progress made as a result of the limited technical help that has been available.

Forestry assistance	1964	1965	1966
Landowners assisted	312	410	493
Management plans	48	177	223
Land involved, acres	8,781	14,460	25,293
Trees planted, acres	374	855	1,518
Timber stand improvement, acres	388	397	311
Woodland fencing, rods	2,033	880	2,286
Timber harvested, thousands of board feet	133	718	1,220
Sawmill operators assisted	32	28	47

On the sidelines, writers and broadcasters are acclaiming the woodland efforts and their importance to the economy. A well-attended press conference kicked off the first tree-planting spree. News articles, radio, and television are being used liberally. The Cooperative Extension Service, Purdue University, is publishing a Lincoln Hills Forestry Newsletter that goes to all forest landowners. ♦



Watering places on the Tigner ranch are located to distribute grazing over all of the rangeland.

Rancher manages his livestock to improve range condition

By Noel Marsh and Ivan W. Dodson

Work unit conservationist and range conservationist, SCS, Magdalena and Albuquerque, N. Mex.

New Mexico rancher Fletcher Tigner uses carefully located water developments and protein supplements on his 40,570-acre ranch to achieve uniform grazing and improve his grass resources.

Tigner says, "The most important objective on a ranch is to use the grass properly, and to do this it is necessary to work with the stock and get good distribution. In good years I don't go out and buy more cattle to graze off the extra grass; it's like money in the bank."

The abundance of good grass is indicated by his 90 to 95 percent calf crop and weaning weights well over 400 pounds.

His ranch is located in some of the more rugged rangelands in the Salado Soil and Water Conservation District.

The eye of the master

Mr. Tigner believes that the key to achieving better livestock distribution is watching his cattle and

learning their habits. He has found that cattle in his rough country go to water only once every 2 days, but use protein blocks every day.

In order to get the cattle to graze some of his higher range, he must induce them to leave the long narrow canyons, climb the steep trails, and stay on the ridge-tops.

He places a protein block at the base of a trail leading to the area he wants grazed. Then he places another block on the first bench higher up. Finally, he locates still another protein station up in the area to be grazed. By doing this, he can keep his cattle at the higher elevations to graze areas that otherwise would not be used.

On his lower-lying, more level pastures, Tigner also has been able to get a greater degree of use on areas farther from water through strategic location of protein blocks.

He agrees with most people that water is the best means of opening large range areas to grazing. He is

convinced, though, that the area served by a watering place can be enlarged and the uniformity of use within the area influenced to a great degree by placement of the protein blocks.

Pipelines and ranch roads

He has installed more than 12 miles of pipeline to provide dependable water where it is needed most.

There were a few livestock "congregation" areas when the Tigners acquired the ranch. The waterings nearest to these have been fenced off and protein stations located at the far side of these pastures to allow the depleted areas to recover.

His ranch roads are built on the contour wherever possible and protected with small diversions to prevent erosion. This, coupled with the maintenance of a good to excellent condition grass cover, makes erosion negligible on the ranch. ♦

FFA soil and forest conservation awards



FFA soil and water management award winner, Johnny McElroy (left), and his vocational agriculture instructor, Floyd Brownsworth, watch a stream of water from McElroy's irrigation well.

Johnny McElroy, 19, Snyder, Okla., received the national soil and water management award, and Paul Early, 19, Kalamazoo, Mich., received the national forestry award at the 1967 Future Farmers of America Convention in Kansas City, Mo., in October.

The \$250 awards, sponsored by the Future Farmers of America Foundation, Inc., were among those presented to outstanding FFA members.

McElroy completed 4 years of vocational agriculture at Snyder High School, graduated in 1966, and now attends Oklahoma State University. A Star State Farmer, he lives on his parents' 3,170-acre ranch near Snyder where he has irrigated his own 160 acres and helped apply terracing on 560 acres of rented land.

Early, a 1966 graduate of Plainwell High School, now attending

Western Michigan University, produced Christmas trees in partnership with his father. During his 4 years in vocational agriculture, he also set up a tree farm including some 30,000 Scotch pine, spruce, and Douglas fir.

Three FFA members received regional awards of \$200 each for their work in soil and water management.

Jimmy Joe Below, 19, Delta, Mo., spent 500 hours helping his father install drainage ditches and clear lowland underbrush on their 300-acre diversified farm near Delta.

Rick Beek, 18, Avon, Mont., maintains a herd of 21 beef cattle on improved meadows and has helped his father with a clearing and drainage project on 110 acres of bottom land.

Steven James Stewart, 18, Bath, N.Y., took over the family farm

and cleared 50 acres of brush, renovated 20 acres of pasture, planted more than 5,000 trees, and installed water-management practices.

Three regional forestry awards of \$200 each were also awarded for outstanding accomplishments.

Charles McCarty, 18, Sylvester, Ga., developed a comprehensive conservation and forestry improvement program under the guidance of his vocational agriculture instructor and his parents.

William Radke, 18, Corvallis, Oreg., has 6,000 Christmas trees, 70 blue spruce plants, 1,000 Shore pine, and 10,000 Bishop pine seedlings, and does forestry work on his uncle's farm.

James Edward McCaulley, 18, Bellwood, Pa., cares for 64,000 trees on his grandmother's farm where he carries out conservation and wildlife management.

All award winners have also served as officers and in other activities of their local FFA chapters. ♦

USDA aid for rural water and sewer systems

About 1,200,000 farm and other rural people have benefited from USDA loans and grants for new or improved water-supply or waste-disposal systems in fiscal 1967. The total is about double the number for the preceding fiscal year and equals the number for all previous years since the program began in 1961.

These people live in or near small rural communities, 1,112 of which received loans or grants from the Farmers Home Administration in the fiscal year ended June 30. Such aid is given to communities of 5,500 or less population. The 1967 projects, in 45 States and Puerto Rico, received \$175.2 million in loans and more than \$22.5 million in grants. ♦

Symposium to discuss education for meeting food and resource crises

The dual crisis in world food supply and in natural resource conservation will be explored in a six-session symposium, "Education for the Crises in Food and Natural Resources," as the program of Section O (Agriculture) of the American Association for the Advancement of Science (AAAS) during its annual meeting in New York, N.Y., December 27 to 31.

Whether major catastrophes can be averted may depend in large part on the education of future scientists and of technologists and technicians whose endeavors complement and supplement the scientists' efforts, many scientists believe.

The first two sessions are devoted to the identification of significant problems that future graduates in agriculture and natural resources will encounter and will explore the adjustments to change required at all levels of higher education in agriculture and natural resources.

A three-member panel representing government, education, and business will open the first session with a discussion of the challenges that future graduates will face. The panelists are: George L. Mehren, assistant secretary, USDA; Charles E. Palm, dean, New York State College of Agriculture, Cornell University; and Thomas Ware, chairman of the board, International Minerals and Chemicals Corporation.

The third and fourth sessions will focus on two areas of widespread concern: "Education and Worldwide Agricultural Productivity" and "Education and Natural Re-

source Renewal, Use, and Preservation." Norman A. Berg, SCS, will speak on "Developmental Training for Career Conservationists."

How institutions can collaborate more effectively and how disciplines can interrelate more productively is the subject of the fifth session.

The final session will consider the future role and character of the rapidly growing technician training programs in agriculture and natural resources.

Other lectures on the program include: "Can Poor Countries Benefit From the Scientific Revolution?," "The Experimental City," and "Environmental Pollution." In addition, the annual meeting will feature general symposia as well as numerous special programs in all major fields of science.

National Congress for Recreation and Parks

"Quest for Quality" is the theme of the 1967 National Congress for Recreation and Parks which will be held in Miami Beach, Fla., December 3 to 7.

The Congress, sponsored by the National Recreation and Park Association, provides an educational forum for the recreation and park movement for the purpose of identifying and examining broad basic trends, issues, and problems which will affect the leisure and recreational patterns of North America.

Approximately 4,000 professional and lay leaders in the recreation and park field will dis-

cuss, explore, and analyze developments affecting their own specialized interest and agency settings.

More than 50 specialized educational sessions covering every aspect of the recreation and park movement, four general sessions, numerous tours, exhibits, and demonstrations have been planned for Congress participants. Manufacturers of recreation and park supplies and equipment will exhibit and demonstrate their products educationally to the Nation's recreation and park leaders. The Congress will also feature the largest outdoor exhibit of parks and recreation equipment in the world.

Among the nationally known speakers are: United Auto Workers' President, Walter L. Reuther; Claude R. Kirk, Governor of Florida; Dr. Robert "Bobby" Brown, former star third baseman of the Yankees and presently an outstanding heart specialist and chairman of the Park and Recreation Board in Fort Worth; and August Heckscher, Jr., New York City Commissioner of Recreation and Cultural Arts.

Dates and places

December 3-7, National Congress for Recreation and Parks, Miami Beach, Fla.

6-8, Western Forestry and Conservation Association, Seattle, Wash.

11-14, American Farm Bureau Federation, Chicago, Ill.

12-15, American Society of Agricultural Engineers, Detroit, Mich.

27-31, American Association for the Advancement of Science, New York, N.Y.

January

21-24, American National Cattlemen's Association, Oklahoma City, Okla.

28-31, National Woolgrowers Association, Dallas, Tex. ♦



The Federal Lands Since 1956, Recent Trends in Use and Management. BY MARION CLAWSON. 1967. 113 pp., illus. Johns Hopkins Press. Baltimore, Md. \$4.

This supplement updates to 1965, the data and analysis included in *The Federal Lands: Their Use and Management*, 1957, reviewed in *Soil Conservation*, December 1965. In addition to a simple updating of the figures, comparisons of actual events since 1956 with the estimates made in 1957 of what was most likely to happen, particularly as to use, receipts, and expenditures, were also made.

New publications

A Study of Residential Water Use. BY F. P. LINAWEAVER, JR., JOHN C. GEYER, AND JEROME B. WOLFF. 1967. U. S. Dept. Housing and Urban Development, Federal Housing Admin., HUD-TS 12. 79 pp., illus. \$0.55. Final report of the study conducted by the Johns Hopkins University in cooperation with 16 water utilities. Data from 41 typical subdivisions representing all important climatic regions throughout the country are included. Major factors influencing water use, including climate, economic level of users, and types of pricing systems, have been considered and incorporated into this study. The results show that residential water demands in any given area are influenced by the total number of consumers, their economic level based on the market value of their homes, the average irrigable area of their lawns, the rate of moisture loss through evapotranspiration, and the quantity of effective precipitation.

The Why and How of Rural Zoning. BY ERLING D. SOLBERG. 1967. USDA Agr. Inf. Bul. 196. 58 pp. illus. \$0.40. Describes the various kinds of rural zoning regulations that can be used, how they are to be used, their purposes, and the benefits to the community and its people that will result from their use. It presents an overall picture of the progress of zoning in the United States and the problems and steps involved in zoning.

Conservation Teaching Charts. 1967.

Boy Scouts of America, New Brunswick, N. J. 10 folded charts, 17 x 22 in. plus detachable legends 17 x 6 in. \$2.50. Simple diagrammatic drawings illustrate the concepts of: The pyramid of life, carrying capacity, animal needs for life, aquatic food chain, terrestrial food chain, plant and animal succession (prairie and forest), pond-to-forest succession, timber stand improvement, and profile of a western mountain. A few paragraphs of very simple text are printed at the bottom of each chart in a way permitting it to be detached. The subject matter both of drawings and of text is so simplified that the effectiveness of the materials for teaching must depend largely on the explanations of the teacher.

Digest of Federal Natural Resource Legislation, 1950-66. BY BRUCE G. CAMPBELL AND P. TIMOTHY LAWLOR, JR. 1967. USDA Econ. Res. Serv. ERS-355. 61 pp. Summarizes natural resource legislation applicable to agricultural, forestry, and related programs enacted by the Congress from 1950 through 1966. Some earlier legislation is also included to provide the researcher with basic applicable legislation.

Outdoor Recreation Space Standards.

1967. U.S. Dept. Int. Bureau of Outdoor Recreation. 67 pp. \$0.45. Tables on space standards, size of the facility, and the number of persons to be served for parkland and recreation areas, play areas, winter activities, golf, tennis, basketball, baseball, boating, canoeing, water skiing, fishing, swimming, hiking, nature study, horseback riding, picnicking, camping, hunting, drama, and concerts, and a bibliography for the tables.

Taxation of Farmland on the Rural

Urban Fringe. BY THOMAS F. HADY AND THOMAS F. STINSON. 1967. USDA Agr. Econ. Rpt. 119. 80 pp. Summaries of State action: legislative, administrative, and judicial, for 23 States (Calif., Conn., Fla., Hawaii, Ill., Ind., Iowa, Md., Mass., Mich., Minn., Nebr., Nev., N. J., N. Y., Ohio, Oreg., Pa., R. I., Tex., Va., Wash., and Wis.).

A Journey with a Raindrop Through a Small Watershed.

BY SHARON BUNCH. 1967. Virginia Assoc. of Soil and Water Cons. Dists., in cooperation with Virginia Soil and Water Cons. Comm., Richmond. An educational cartoon story for the lower elementary grades. Single copies available on request.

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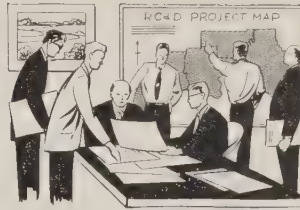
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From the Administrator:

Rural Renaissance in RC&D Projects



The great challenge before conservationists, as Assistant Secretary John A. Baker recently said, is to help our Nation step up to a new level of civilization through the progressive process of "creative urbanization and rural renaissance."

To do this, Mr. Baker said, calls for powering the twin thrusts of (a) improving the quality of man's total environment through a Resources in Action program, and (b) building Communities of Tomorrow that match the dignity of man.

Resource conservation and development projects, now initiated in 41 areas of the country, are more than an approach to improving conditions in rural areas. They are, as the articles in this issue demonstrate, effective tools in the process of creative urbanization and rural renaissance.

The RC&D projects are a Department program for which leadership has been assigned to the Soil Conservation Service. To accomplish the goals as defined in the Department's policies for Agriculture/2000, SCS has already made changes in direction of its efforts. These changes provide for more effective assistance to conservation districts and to others with whom we work.

RC&D projects are locally initiated and sponsored, usually on a multicounty basis, by county governments, town and city governments, special purpose districts, and other local citizen groups. They are participated in by State agencies and approved by the State governor.

A project plan is developed be-

fore the Secretary of Agriculture authorizes launching the operational phases. In addition to Department agencies, other Federal and State agencies are providing assistance to help people help themselves. The separate project measures tie together into an overall plan under which the many individual elements can be carried forward together in a coordinated manner.

The Lincoln Hills Project in Indiana, the first in the Nation to get into operation, has gained recognition as an outstanding example of such local initiative and coordination. The "rural areas development" idea took hold in that four-county area even before its designation as a pilot RC&D project. People there became accustomed to working together to tackle common problems of soil erosion, low income, poor health, inadequate community facilities, and dwindling population.

The cumulative effect of the wide range of resource and economic developments accomplished in these projects is to bring to these communities the best of both urban and rural life. The creation of new opportunities for employment and for industrial and commercial activity in a rural setting and the provision of first-class community facilities for health services, education, and recreation combine the economic and cultural advantages usually associated with city life with the natural amenities of the country environment.

Such broad-based resource development serves to abolish the dichotomy between rural and urban life. It utilizes the space and

resources of the countryside to help solve the problems of congested city cores. It matters not whether we call this process one of creative urbanization or one of rural renaissance because, correctly considered, it is both.

Results are beginning to accrue, in Lincoln Hills and other RC&D projects, in increased jobs, increased income from old and new sources, new taxable wealth, and improved community facilities.

Sponsors of the Lincoln Hills and other RC&D projects take a broad viewpoint both in their planning and actions which go far beyond natural resource conservation, development, and utilization. This is as it should be, since they are in a unique position to understand problems and can best coordinate and direct local efforts with those of State and Federal agencies.

Many measures are being carried out that are not within the authority or responsibility of the Department of Agriculture and its agencies. Guidance is given to local people in securing technical and financial help of the nature required from other sources.

Resource planning and development, however, is not limited to RC&D project areas. A similar approach can be taken elsewhere. Opportunities exist everywhere for local leadership to initiate and accept responsibilities for further resource development.

Technical Action Panels can assist local people with many worthwhile activities. Conservation districts can be a directing and coordinating body to perform many resource functions which are an essential part of the total job to be done.

The Soil Conservation Service is in a position to take a leading role in bringing about the rural renaissance that we seek.

D. A. WILLIAMS



If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

Water control in RC&D area

(Continued from page 111)

Pigeon River—are pending approval for Federal assistance in planning.

Two RC&D Project measures, Deer Creek in Perry County and Buck Creek in Harrison County, will provide for flood prevention and water development on about 15,000 acres of land in the Lincoln Hills.

The Deer Creek Project measure, consisting of one multipurpose flood-prevention and recreation structure on National Forest land, is scheduled for construction in fiscal year 1969.

The Buck Creek development, consisting of a multipurpose structure for flood prevention, private recreation, and agricultural water management, will provide about 400 acres of water for a water-deficient area in Harrison County.

The 20,750-acre Baker Creek Improvement Project area, now plagued by floods 4 years out of every 5, is scheduled for a complete "overhaul" by the project sponsors, the Spencer County Soil and Water Conservation District and the Spencer County Drainage Board. Already the conservation district's stepped-up program of terraces, grassed waterways, and grade-stabilization structures is showing a marked reduction in siltation of the streams. Surveys have been completed for 30 miles of channel reconstruction to be



A contractor and his wife, Mr. and Mrs. C. J. Rust, Cortland, Ind., watch construction from a convenient overlook above the site of a watershed dam.

carried out by the drainage board.

For years the owners of 200 farms in the area have planted and replanted, risked and lost their seed and fertilizer in a battle against the floods. Rapid runoff from the upland has caused gullies to form in the loessial soil. Silt has clogged stream channels in the fertile bottom lands and caused untold acres of grain crops to go unplanted or unharvested. Homeowners from three towns in the same area have suffered from poor drainage and mosquito-infested swamps at their back doors.

The Baker Creek Project involves close cooperation of several local and Federal agencies. The Soil Conservation Service will provide technical services for recons-

truction of four main channels. RC&D funds will help pay the cost of flood control and agricultural water management.

The drainage board assumes local financial responsibility for project installation, operation, and maintenance. A long-term loan has been provided by the Farmers Home Administration to the drainage board, which will collect assessments from benefiting landowners. The Agricultural Stabilization and Conservation Service will cost-share with farmers establishing erosion-control practices.

Together, these water management and development measures will serve the water needs of the Lincoln Hills area and give a lift to its economy. ♦

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Three critical sediment sources

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A snow surveyor hikes on skis into the high mountain country of Arizona to measure the water content of the snowpack. The data will help SCS predict the amount of spring runoff.

Critical . . .

Much of the sediment pollution that fills and fouls our streams and lakes comes from a remarkably small part of the total landscape.

Small areas and narrow bands of land that suffer destructive disturbance and extreme erosion produce sediment in amounts out of all proportion to their size.

This issue of *Soil Conservation* calls attention to three types of critical erosion areas that are not yet effectively dealt with in the Nation's soil and water conservation efforts.

Surface-mine spoil: A recent national survey of surface mining focuses new attention on the land destruction and water pollution so often resulting from this important economic activity.

Our lead article by Darnell Whitt (p.123) gives us the benefit of insights into the problem he gained as a member of the working committee that prepared the report submitted to the President through the Secretary of the Interior (*Soil Conservation*, Oct. 1967, p. 69.)

Streambanks and roadsides: Especially difficult to deal with are the vulnerable thin lines of streambanks and roadsides that interlace the American landscape.

Agricultural Engineer R. C. Barnes, Agronomist B. D. Blakely, and Soil Conservationist Cal Roark collaborated on the two articles (pp. 126, 129) that summarize the conservation problems of these critical sediment sources.

soil conservation

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Surface-mined land

How much? What next?

By D. M. Whitt

Director, Plant Sciences Division, SCS

More than 3 million acres of surface-mined land in the United States has been disturbed by surface mining. About 2 million of this has been left to plague local communities with aggravating problems of soil erosion, sedimentation, water pollution, and scenic devastation.

However bleak the prospect may appear when the giant earthmoving machines move on, the future of strip-mined areas is not hopeless. They can be reshaped and restored to pleasing components of the landscape. The outwash of sedi-

ments and contaminants can be restrained. Reclaimed areas can be put again to productive and pleasurable uses.

For 30 years the Soil Conservation Service has been giving technical help to private landowners and to conservation districts in the stabilization and vegetation of surface-mined areas. Experience and information gained in that work combined with the findings of a national study just completed at the request of the Congress make clear five facts of great significance to rural America.

THESE ARE THE FACTS

(1) Most of the affected land is in private ownership.

(2) Land needing attention is present in all States, and most of it is in rural areas.

(3) Private landowners are doing something about the problem.

(4) Reclaimed areas can be put to a variety of beneficial uses.

(5) Greater efforts than in the past are needed to restore surface-mined land.



Strip-mined land, such as the coal cut in the upper right, in many cases can be reclaimed and returned to productive use as the pasture below.



The national study was made at the direction of the Congress in Public Law 89-4. Several Federal departments and agencies participated under the leadership of the Department of the Interior, with the Soil Conservation Service and the Forest Service representing the Department of Agriculture. The report was transmitted by the President to the Congress on July 3, 1967. Here in brief are the significant facts about surface-mined land in the United States.

As of January 1, 1965, an estimated 3.2 million acres of land had been disturbed by surface mining. Of this amount, around 2 million acres was in need of conservation treatment and rehabilitation.

About 91 percent of the affected acreage is in private ownership, and nearly half of that is in small scattered ownerships. These smaller tracts can best be treated as part of the total conservation management of the farms or other ownership parcels of which they are a part.

The table is from the report of the national study, *Surface Mining*

and *Our Environment*, by the U.S. Department of the Interior.

All States have land that has been affected by surface mining. The study showed, however, that surface-mined land conservation is a rural opportunity.

More than 80 percent of the mined land surveyed was a mile or more from towns of 200 or more people. About 40 percent of the mined land was more than 5 miles from towns of this size.

About one-third of the land disturbed by surface mining has been rehabilitated. Some of this was restored by natural seeding, but more than half was treated through the efforts of private owners.

Soil and water conservation districts have been active in restoration of surface-mined areas. Information developed in the national study showed that 127,747 acres of surface-mined land was successfully treated in 300 conservation districts in 5 years, 1960-64. This work involved 5,255 district co-operators in 31 States.

During the same period, State

forestry agencies, in cooperation with the U.S. Forest Service, provided assistance for restoring 36,710 acres of surface-mined land.

Mining firms have greatly increased their conservation efforts in recent years. Surface-mine operators in 22 States have formed the Mined Land Conservation Conference to bring about restoration of mined land. In addition, associations have been formed for this purpose in several States.

Associations in the Appalachian Region have been responsible for reforestation and seeding of 74,000 acres.

The National Sand and Gravel Association reports that its members rehabilitated more than half of the acreage they mined in 1965. Two years earlier, they treated only one-fourth of the total acreage disturbed.

Restored surface-mined land can serve several useful purposes. A survey in 1966 by the SCS in 14 States in all parts of the country showed that the greatest potential uses were woodland production and wildlife habitat.

Status of land disturbed by strip and surface mining in the United States as of January 1, 1965, by State (Thousand acres)

State	Land requiring reclamation ¹	Land not requiring reclamation ¹	Total land disturbed ²	State	Land requiring reclamation ¹	Land not requiring reclamation ¹	Total land disturbed ²
Alabama.....	83.0	50.9	133.9	Nebraska.....	16.8	12.1	28.9
Alaska.....	6.9	4.2	11.1	Nevada.....	20.4	12.5	32.9
Arizona.....	4.7	27.7	32.4	New Hampshire.....	5.1	3.2	8.3
Arkansas.....	16.6	5.8	22.4	New Jersey.....	21.0	12.8	33.8
California.....	107.9	66.1	174.0	New Mexico.....	2.0	4.5	6.5
Colorado.....	40.2	14.8	55.0	New York.....	50.2	7.5	57.7
Connecticut.....	10.1	6.2	16.3	North Carolina.....	22.8	14.0	36.8
Delaware.....	3.5	2.2	5.7	North Dakota.....	22.9	14.0	36.9
Florida.....	143.5	45.3	188.8	Ohio.....	171.6	105.1	276.7
Georgia.....	13.5	8.2	21.7	Oklahoma.....	22.2	5.2	27.4
Hawaii.....	(3)	(3)	(3)	Oregon.....	5.8	3.6	9.4
Idaho.....	30.7	10.3	41.0	Pennsylvania.....	229.5	140.7	370.2
Illinois.....	88.7	54.4	143.1	Rhode Island.....	2.2	1.4	3.6
Indiana.....	27.6	97.7	125.3	South Carolina.....	19.3	13.4	32.7
Iowa.....	35.5	8.9	44.4	South Dakota.....	25.3	8.9	34.2
Kansas.....	50.0	9.5	59.5	Tennessee.....	62.5	38.4	100.9
Kentucky.....	79.2	48.5	127.7	Texas.....	136.4	29.9	166.3
Louisiana.....	17.2	13.6	30.8	Utah.....	3.4	2.1	5.5
Maine.....	21.6	13.2	34.8	Vermont.....	4.2	2.5	6.7
Maryland.....	18.1	7.1	25.2	Virginia.....	37.7	23.1	60.8
Massachusetts.....	25.0	15.3	40.3	Washington.....	5.5	3.3	8.8
Michigan.....	26.6	10.3	36.9	West Virginia.....	111.4	84.1	195.5
Minnesota.....	71.5	43.9	115.4	Wisconsin.....	27.4	8.2	35.6
Mississippi.....	23.7	5.9	29.6	Wyoming.....	6.4	4.0	10.4
Missouri.....	43.7	15.4	59.1				
Montana.....	19.6	7.3	26.9	Total.....	2,040.6	1,147.2	3,187.8

¹ Compiled from data supplied by Soil Conservation Service, U. S. Department of Agriculture.

² Data compiled from reports submitted by the States on U. S. Department of the Interior form 6-1385X, from Soil Conservation Service, and estimates.

³ Less than 100 acres.



A one-time sand and gravel pit in Kansas now is a 30-acre lake providing boating, swimming, and fishing, with pleasant picnic facilities on the shore.

More than a fourth of the land disturbed by surface mining has a potential for farm and forest recreation. Smaller percentages of the affected areas have potential for cropland, residential, institutional, or industrial uses.

Many of the restored sites have the potential for multiple uses. The sum of the acreages reported for the various uses in the survey exceeded the total area of the sample by 65 percent. They were:

Potential use	Percent of disturbed areas
Woodland	39.2
Wildlife habitat	38.6
Farm and forest recreation	27.2
Pastureland	17.8
Rangeland	13.3
Ponds and reservoirs	9.9
Residential, institutional, and industrial	6.5
Cropland	3.4
Other (unspecified)	8.6
Total	164.5

Our Nation's increasing requirements for land and water make it imperative that attention be given to areas affected by surface mining. Fortunately, much is known about how to make mining and later uses of the land compatible. Greater cooperative efforts by Government, private landowners, and the mining industry are needed.

Some necessary features of restoration and conservation efforts on surface-mined land indicated by the national study and the experience of the Soil Conservation Service are:

(1) Federal agencies should demonstrate leadership by restoring the surface-mined lands they administer, with a view to completing the job within 10 years. The Forest Service is already making headway in rehabilitating mined land on the National Forests.

(2) Well-planned operations and good mine housekeeping with a view to prompt restoration should be the publicly announced policy of every mining firm.

(3) A program of Federal technical and financial aid should be provided to accelerate treatment of old mined areas to eliminate sources of water pollution and other damaging effects.

The program should be coordinated with activities of soil and water conservation districts, the mining industry, States, and municipalities, on watershed-wide plans of appropriate scale. Restoration measures should be included in the conservation plans of the individual landowners.

(4) Federal and State agencies and local conservation districts should work with the mining industry to develop mutual confidence and trust, to develop workable mining standards, to encourage planning of restoration measures as an integral part of the mining operation, and to disseminate technical information as it is developed.

(5) Research programs, studies, and field demonstrations should be expanded. Although much information is available, many problems of treating mine spoil have not been solved. Many opportunities for making surface-mined lands an asset to the community have not been realized.

Surface-mined lands properly restored can add greatly to the quality of man's environment. It is essential to remember, however, that these lands are not isolated. They are an integral part of the drainage areas in which they are located, and their restoration and conservation treatment can be accomplished most effectively and efficiently as part of the total soil and water conservation program already underway on privately owned lands. ♦



Streambank erosion

A widespread problem too big for a landowner to handle alone

By R. C. Barnes, Jr.
*Agricultural engineer, SCS,
Washington, D. C.*

Streambank erosion is a major problem along many miles of the Nation's rivers and streams.

It is estimated that there are 300,000 miles of streambanks in the United States subject to erosion and producing about 500 million tons of sediment each year.

Removal of sediment from stream channels, harbors, and reservoirs is costing about \$250 million a year. Loss of land adjacent to stream channels is valued at about \$11 million annually.

Streambank erosion is a continuous problem on constantly flowing streams, although it may vary in intensity throughout the year. On intermittent streams, erosion occurs each time floodwater flows down the stream channel.

Damage is increased by waterborne ice or debris. The problem is aggravated by poorly placed manmade structures, overgrazing, and other factors that affect runoff and streamflow.

The damage is evident in many ways: in undercut streambanks, caving and sloughing of adjacent land, and loss of crops and of buildings, fences, and other physical improvements. It shows in the raw scars left to mar the beauty of the surrounding landscape.

An expensive problem

One of the end products, and a costly one to man, is the sediment produced by streambank erosion. This sediment fills streams, waterways, and harbors; increases flooding; smothers crops; and spoils the habitat for fish and wildlife.

Sediment affects municipalities by increasing the cost of filtering and processing water for municipal and industrial use, causing extra wear on pumping equipment, and creating the need for extra maintenance of roads, bridges, parks, and related facilities.

A survey report, "Conservation Treatment of the Dry Creek

Watershed, Sonoma and Mendocino Counties, California," estimates that the sediment produced from streambank erosion in the 313 miles of tributaries in the watershed, with a drainage area of 130 square miles, amounts to about 164,000 tons annually. It is further estimated that, with proper treatment of the streambanks where needed, this amount could be reduced by 74 percent to about 39,000 tons a year.

Streambank erosion-control methods must vary with different conditions. In humid areas, control of live streams is mainly by the use of vegetation supplemented by mechanical measures. In semi-arid and arid areas, protection is primarily by mechanical means.

Control methods

Mechanical erosion-control measures usually fall into two general classes: (1) Those which retard flow along the bank and promote



With the bank sloped and the lower part protected by rock riprap, this section of Buffalo Creek in New York is being stabilized with vegetation. The costly effects of streambank erosion are illustrated (opposite page) on a farm in Louisiana where the Red River cuts away a strip of land 200 feet wide in 3 weeks.

Group projects and cost-sharing get the job done

deposition, and (2) those which form a cover and protect the bank from direct action of the current.

Permeable jetties constructed of piling, rock, trees, or other materials are examples of protection causing deposition. Jetties may be designed either to deflect the current away from the bank or to reduce its velocity adjacent to the bank to a degree that erosion is halted.

Living vegetation, brush matting, rock riprap, concrete, and asphalt linings are examples of protective bank cover.

Streambank-erosion control usually requires group action by the landowners affected, since the problem extends beyond any one owner's control.

The Soil Conservation Service provides limited technical assistance through soil and water conservation districts for streambank-erosion control as a part of regular conservation operations.

SCS also provides technical and financial assistance to individuals and groups of landowners to treat streambanks in approved watershed projects. The Buffalo Creek Project in western New York is an example of what can be done with adequate planning and installation through project action.

Project action

Buffalo Creek watershed covers an area of 437 square miles. The problem was mainly erosion of roads and farmland and of streambanks. The resulting sediment was being deposited in Buffalo Harbor where it interfered with shipping and had to be removed at great expense. This public damage justified Buffalo Creek as one of 11 flood-prevention watersheds authorized by the Flood Control Act of 1944. The sponsor was the Joint Board—Erie Wyoming Soil and Water Conservation District.

Stabilization work on Buffalo

Creek consisted generally of bank-sloping, riprapping the lower toe of the slope, and planting the upper bank to adapted grasses and shrubs. Some 59 miles of channel were treated.

A study by the Agricultural Research Service showed that the amount of sediment that had to be removed from Buffalo Harbor was reduced by 24 percent by 1963, when 75 percent of the project was completed. Studies are continuing since completion of the project.

Teamwork by landowners

The teamwork approach in stabilizing streambanks is also being used by landowners using their own funds supplemented by cost-sharing from other sources. For example, cooperators of the Little Snake River Soil and Water Conservation District, Wyoming, are making use of technical help from the Soil Conservation Service and financial aid from the Agri-

Rock riprap is being laid at the base of a section of Buffalo Creek, N. Y., after bank sloping (upper). Vegetation alone has stabilized the sloped banks of Stillwater Creek in Kentucky (middle).

cultural Stabilization and Conservation Service. Timely stream-bank-protection measures there averted serious damage to irrigation canals that carry water to about 60 ranches in the valley. Blankets of trees or rocks and rock jetties were used to keep erosive currents away from the banks.

The Agricultural Stabilization and Conservation Service gave financial assistance to 3,623 streambank-stabilization projects in 1966. SCS reports indicate that treatment was accomplished on 469 miles of eroding streambanks.

When compared with the total job to be done, the rate of accomplishment is much too slow.

At the present rate of treatment, it will require some 600 years to treat the Nation's eroding streambanks. Methods of controlling streambank erosion are known. The costs are high and generally beyond the means of individuals or groups. Broad public interest is involved where erosion occurs along streambanks. This problem requires additional governmental action in cooperation with private landowners if it is to be solved. ♦

A combination of heavy boulders and vegetation (right) were used to tame a cutting bend in a western stream, the White River in Rio Blanco County, Colo.



Probably more people see soil conservation work done on and along highway rights-of-way than on all other lands combined. They also see the scars of erosion on unprotected cuts and fills and the deepening gullies in neglected roadside ditches where modern conservation measures have not been used.

For roadsides are the most public segments of the American landscape, and roadside erosion is one of the Nation's most widespread conservation problems.

There are nearly 3.2 million miles of roads in rural America, and the mileage gets bigger every year. Most of these roads require vegetation on the shoulders, cuts, and fills. In addition, engineering structures are needed in many places to retard runoff from the areas above the rights-of-way and to provide safe drainageways.

Doing better now

Fortunately, most new highways constructed with Federal assistance or by State highway departments are of good design and are accompanied by adequate treatment of disturbed areas and drainageways for erosion control. But hundreds of miles of older highways have active erosion in roadside ditches and on cut banks. And uncounted thousands of miles of

Roadside conservation

We've made a good start, but much remains to be done on our most-public land areas

By B. D. Blakely and Cal L. Roark

Head agronomist, Plant Sciences Division, and soil conservationist, Resource Development Division, SCS, Washington, D. C.

secondary and local roads are critical sediment sources and a hazard to adjoining farmlands.

It is estimated that eroding roadsides discharge 56½ million tons of sediment annually into the Nation's streams, reservoirs, and harbors.

The Soil Conservation Service since 1935 has actively cooperated with local, State, and Federal highway agencies throughout the country to correct roadside erosion problems. This effort started in the early days of the CCC camps, continued in the erosion-control demonstration projects and has steadily progressed through the operations of soil and water conservation districts.

More recently, provisions for stabilizing roadsides have been an important part of many small watershed projects under Public Law 566 and currently are a

feature of resource conservation and development projects.

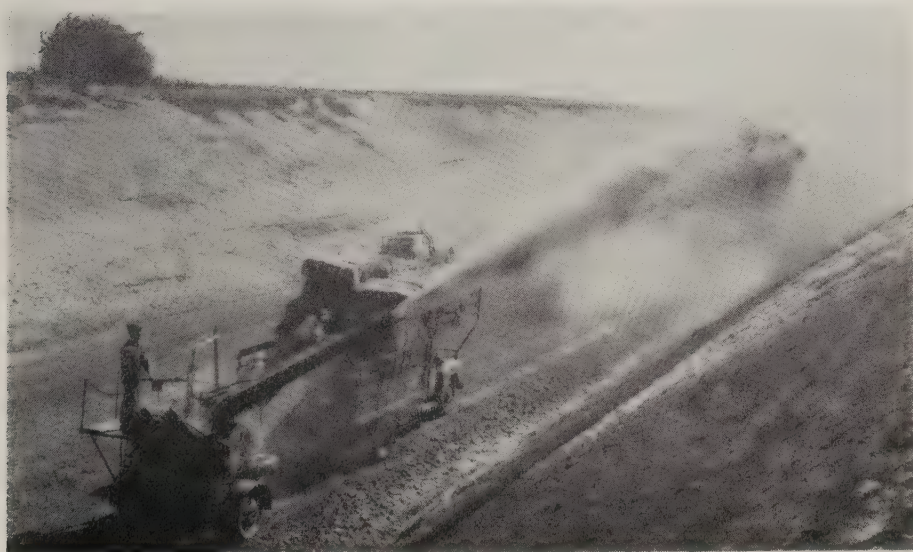
In these projects, Federal funds are used to help defray the cost of erosion-control measures on roads which, if left in their present state, would continue to pour sediment into streams and impoundments.

In the Coosa River watershed in Georgia more than 600 miles of roadside have been stabilized as part of the flood-prevention project. In the 46 small watershed projects in that State, more than 1,200 miles of roadside have been treated, with the counties providing labor and equipment.

In less than 3 years, the Gwinnett County RC&D Project in Georgia has stabilized more than 250 miles of roadside.

Miles of progress

Treatment of roadsides as critical erosion areas has been an important feature of small watershed projects in South Carolina and Tennessee, among other States. In South Carolina, 13 of 21 operating small watershed projects include plans for treating 221 miles of roadside as critical sediment sources. By the end of the 1967 fiscal year, treatment had been completed on 125 miles of roadside. In Tennessee projects, 119 miles of



Modern machinery has made rapid seeding, fertilizing, and mulching of steep slopes possible.

roadside treatment had been completed of 162 miles planned.

While much has been done in watersheds and RC&D projects, there is still a much bigger job along the roads outside of these authorized areas. Farm-to-market roads comprise a major part of the total highway mileage of the United States. On these roads the total cost for erosion control is borne by the counties and townships.

Counsel and guidelines

SCS assistance in the enormous task of stabilizing and beautifying roadsides has ranged from technical consultative service to the making of onsite investigations and preparing guidelines for use by highway engineers.

According to the needs in each case, SCS has provided recommendations for establishing vegetation, designs of erosion-control structures, and detailed soil survey information. All of the work has been in cooperation with soil conservation districts.

Highway engineers have used soil maps and information provided by SCS as a guide for locating highway routes and finding suitable fill material and gravel beds. Soils information provides clues as to the stability of the soil under heavy traffic, susceptibility to frost heaving, and the character of underlying material. Soil surveys provide valuable information regarding adaptability of plants and the requirements for ground cover.

Over the years SCS, through its plant materials centers and working with State highway commissions, has planted thousands of acres of grasses, legumes, vines, shrubs, and trees along highways to determine their value for specific roadside conditions. Plants were needed to meet special requirements of highway protection, including low maintenance cost, quick establishment, and, in the North, the ability to survive the toxic materials used on icy

pavements. The results of the trials have been the basis of guidelines for highway plantings throughout the country.

Examples across the Nation

Road authorities at all levels now are recognizing the need for thorough and effective treatment in the interest of good road maintenance, traffic safety, economy, and beautification.

The Virginia Highway Department annually earmarks funds for stabilization of sediment-contributing roadsides. The cooperation of State highway officials in watershed projects is an outgrowth of memorandums of understanding between soil conservation districts and the Highway Department signed in the 1940's and 1950's.

The Montana Legislature passed that State's Highway Seeding Law

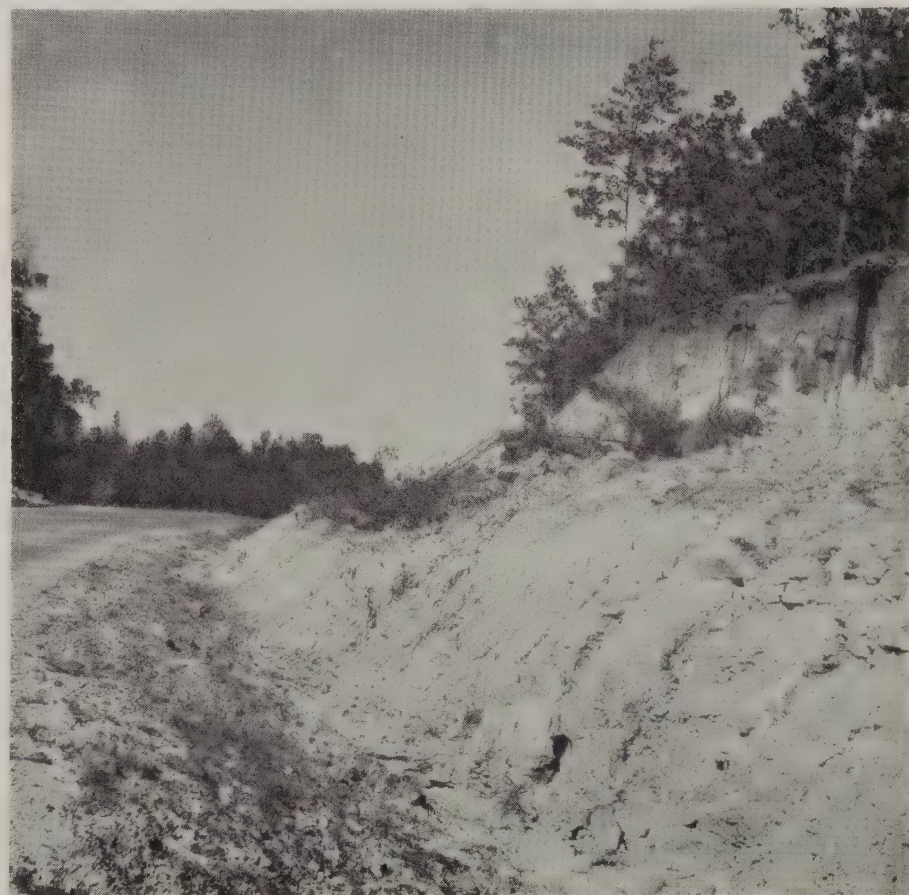
in 1961. The SCS State soil conservationist was named chairman of the Highway Seeding Committee. Representatives of SCS and the highway department make on-site inspections and draw up recommendations for seeding to be done by contractors.

In New Mexico, the highway commission annually provides funds for SCS technical assistance under a working agreement between the two agencies. Such assistance includes selection and development of plants for stabilization and beautification and consultative services by SCS on other erosion-control measures.

In South Carolina, the work of the State Highway Department and SCS in roadside conservation has been so outstanding that the Legislature passed a resolution in 1962 commending the two agencies.

(Continued to p. 136)

Road cuts left uncovered can lose more than 100 tons of soil per acre a year.



Anyone for jacks? . . .

Angle-iron structures tame river current

By **Ronald P. Church**

Work unit conservationist, SCS, St. Joseph, Mich.

By dressing up the old game of jacks with some No. 6 galvanized wire, $\frac{1}{4}$ -inch angle iron, and $\frac{3}{4}$ -inch cable, SCS engineers in Michigan have found a way to beat old man river at his own game of streambank erosion.

Undercutting of a 600-foot section of St. Joseph River bank has been halted by installing a system of jacks to slow the current.

For many years, the late Cecil Potts tried to protect this section on his farm from damaging currents, high water, and ice by using concrete and riprap. But the river continued to cut away about 10 feet of land a year.

As a cooperator with the St. Joe

River Soil Conservation District, he turned to the SCS office at St. Joseph and received technical help in developing a complete conservation plan.

SCS engineers recommended that Mr. Potts use a system of jacks similar to the type of installation used effectively in several Western States. This was one of the first attempts to use jacks in a Michigan stream.

Since the St. Joseph River is a navigable stream, Mr. Potts first obtained approval from the U.S. Army Engineers to install this work of improvement.

The jacks were made from pieces of $4 \times 4 \times \frac{1}{4}$ -inch angle iron 16 feet



Patterned after a child's plaything, the jacks anchored near the bank still the stream's flow.

long bolted together at the middle. Then 365 feet of No. 6 galvanized wire was strung between the arms of each jack. A crane placed them on the river bottom where it meets the bank.

The jacks were tied together with two strands of $\frac{3}{4}$ -inch cable and secured to buried railroad ties at four places along the riverbank and protected by a rock jetty at the upstream end of the system.

Installation cost was about \$5.50 per lineal foot.

In the past, soil from this area washed downstream, plugged the river channel where it was deposited, and caused the current to shift and erode other areas. The river carried finer soil particles farther downstream to increase the pollution problem.

Other conservation practices, such as sloping and seeding, rock riprap, and rock or willow jetties, can be effective, depending upon the soil type, depth of water, direction of current, and cost of materials at each location.

But after watching the effect of this system of jacks for the past 3 years, both the present farm operator, Mr. Mike Koebel, and SCS personnel are convinced that many other opportunities exist for the use of jacks where streambank erosion is a serious problem in this part of the country. ♦

Iron jacks protect a river bank in Berrien County, Mich. Note the ripples of the current only to the right of the barrier.



One State's answer to strip mining

By Robert E. Quilliam

State conservationist, SCS, Morgantown, W. Va.

A surface-mining act passed by the West Virginia Legislature has boosted surface-mining restoration by stepping up team work in a cooperative program that has been in operation for nearly 10 years.

The 1967 revision of the Strip Mine Law lays down standards that improve the quality of grading and permits better water control and discharge.

New standards include a reduction in the permissible height of the vertical walls of a cut or pit, a limit on the amount of material that may be pushed over the edge of the hill, and requirements for covering toxic materials, all of which increase the effectiveness of replanting operations.

The new law also authorizes the Department of Natural Resources to reject an application for a permit to mine if extreme damage to the landscape may result.

The current program began in 1958 when the State Legislature permitted surface-mine operators to transfer responsibility for revegetation to soil conservation districts. This plan allowed the districts to accept contracts from the operators.

During the intervening decade, the State Department of Natural Resources, the State Soil Conservation Committee, and the several local soil conservation districts, have worked closely with the Soil Conservation Service and the West Virginia University Agricultural Experiment Station in the mobilization of technical services to guide the restoration work. The annual rate of planting reached

8,057 acres in the spring of 1967, and plans are made to greatly increase this amount in 1968.

The districts call upon the technical assistance of Soil Conservation Service to prepare conservation planting plans. SCS, with the aid of information obtained from a 6-year study of strip-mine spoil planting trials, and the help of the West Virginia University Agricultural Experiment Station personnel, developed a plant adaptation guide for classifying soil materials. Field studies and experience show that for successful plantings the selection of appropriate trees,

shrubs, grasses, or legumes must be based on soil type, acidity, stoniness, and the severity of the slope.

In addition to classifying sites, SCS prepares revegetation plans and provides some of the technical assistance needed to carry out the plans. To date, more than 2,100 conservation plans for revegetation have been prepared.

Since the original planting guide was established, recommendations for adapted plants have been revised and improved on the basis of field studies and the evaluation of plant performance over a 10-year period. Sixty-eight trial





Mine spoil (left) has been leveled, fertilized, and seeded. Scotch, white, and red pine (center) average 4 feet high 6 years after planting.



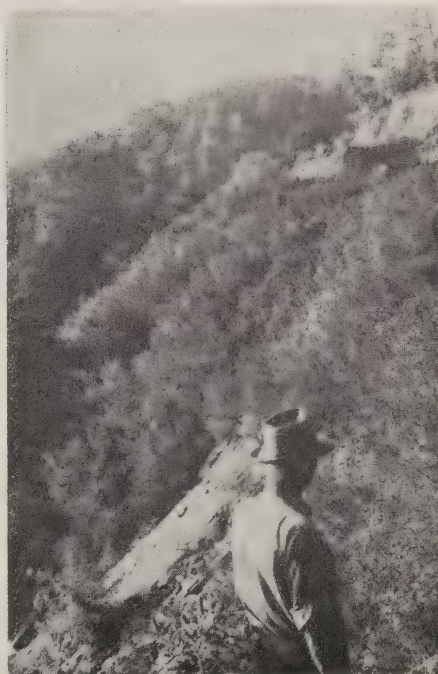
planting sites containing 190 species of woody and herbaceous plants have been used by the Soil Conservation Service to find best plants for revegetating mine spoil.

Black locust is used more extensively than any other woody plant. It has performed well as a first-step pioneer in the reestablishment of native climax species through natural means. Black locust also improves wildlife habitat and stimulates herbaceous plants.

Other woody plants used for revegetation are autumn-olive and Virginia, shortleaf, Scotch, white, and red pines. Grasses and legumes



Unightly stripped areas and spoil banks (left) pollute a roadside stream.



are used on the more gentle slopes or in combination with woody plants.

Soil conservation districts have demonstrated that they are fully capable of carrying out a revegetation program. They have successfully marshaled the needed manpower and equipment and obtained and handled planting stock, seeds, fertilizer, and lime. They have also solved problems of transportation, training of people, and supervision of work crews.

Especially important to West Virginia, the only State entirely within the Appalachian Region, is the employment provided to local citizens through the mine-restoration work of conservation districts. Planting crews of men, who were formerly unemployed or underemployed, now earn almost \$100,000 a year. During the past years, employment rose from 367 men in 1965 to 615 in 1967. And the work to be done in 1968 is expected to break all previous records.

Since commercial strip mining first began to lop off mountain tops back in 1938, West Virginians have been concerned about how to have the products of mining without permanent damage to their other natural resources. The answer, slow to come, is a well-balanced team.

Through the cooperation among public agencies, mine operators, and others in West Virginia, the State now has an effective reclamation program with a promising future. ♦

A planting of black locust and sericea lespedeza has stabilized a steep overcast slope.

A tale of five persimmon trees



Max Strom stands before one of the five remaining persimmon trees left at the request of Hugh Bennett.

"Leave those persimmon trees. When times get hard, you'll always be able to get a 'possum out of them."

This was the admonition of Dr. Hugh Bennett as he talked with Max Strom, a supervisor of the Gadsden Soil and Water Conservation District in Florida following a conservation demonstration tour of Mr. Strom's 320-acre corn and shade tobacco farm.

That day was many years ago when the conservation effort in Florida was in its infancy, and the driving force of Hugh Bennett's enthusiasm was coaxing a national movement into action. At this meeting Bennett met a man whose enthusiasm for soil and water conservation matched his, and the farm today shows the fruits of that love of the land.

Bennett was referring to several wild persimmon seedlings growing in the fencerows of otherwise well-kept fields. Max Strom had

said that as soon as some of the hands had time away from their regular chores, he'd have the sprouts grubbed out.

Instead, Strom took the Chief's advice and left the trees. Through the years, as the conservation farm plan required realignment of the fences, he fenced around the trees. None was ever cut, but today only five remain; the rest have died of old age.

Max Strom not only followed

Dr. Bennett's advice about the trees, but he has become an ever stronger supporter of soil and water conservation. His farm is a picture of what conservation will do on the rolling clay hills of north Florida.

Max now proudly points out that the fourth generation of Stroms is beginning to work this land—a heritage of conservation passed on from generation to generation. ♦

Lessons in hydrants and dandelions

The most valuable "equipment" to carry on an effective outdoor conservation program is a teacher who knows how to open the door. It doesn't take dollars to establish an outdoor conservation laboratory; it just takes common horse sense.

For example, hydrants in the city usually have moisture at their bases where grass can be found, perhaps even dandelions. Many things can be learned from an old fireplug, such as:

Where does the water in the hydrant originate?

Why do we have hydrants?

Where did the dandelion come from?

Why is the grass green?

What happens to dandelions in winter?

Children, especially, must be led to discover—be stimulated to inquire—and helped to develop a sense of wonder. We must begin with the kindergarten and increase this type of teaching to develop informed adults.

Sometimes we have a tendency to think that it takes acres and acres of field and forest to teach ecology and conservation properly, but the truth of the matter is that all this can be accomplished within a limited area. Remember, "in most schools it should be nec-

essary to travel no more than three times the length of a desk in order to see examples of many things that are worth observing."

Our natural resources are endangered; let's train the coming generation so they can make amends for our mistakes.—*MERCER COUNTY SOIL CONSERVATION DISTRICT NEWSLETTER, Trenton, N. J.* ♦



At a time when we see numbers replacing our names on bank accounts and payrolls, in addresses and phone books, names are replacing anonymous numbers to designate small watershed reservoirs or lakes in many parts of the country.

The names usually honor individuals who gave leadership in the project, or otherwise won recognition in the community.

Take Lake Martha, for instance. This beautiful reservoir in the Buntyn Creek Project, in the Tallahatchie Soil Conservation District, is the only watershed reservoir in Mississippi to be named for a woman.

Martha, wife of W. P. Rainey, a commissioner of one of the sponsoring districts, wouldn't let the men quit when they became discouraged because easements were hard to get.

"She ran a country store here," says Otey J. Sherman, a neighbor. "With groceries she dispensed encouragement. When she collected her accounts, she collected easements. She, more than anyone, put the project over. That is why I named the lake, which is mostly on my land, for her."

"Martha Rainey earned the

Now, that's a switch . . .

Names replace numbers on watershed lakes, as projects honor leaders

right to be honored," said Sherman, who erected a sign to proclaim the name he had given the reservoir. "But even if she hadn't, I would like to see the lake carry a name other than 'Site Four,' or whatever it is called on the watershed plan."

Charles C. Snapp is a dreamer who lives by the side of the road and watches the race of men go by—quite literally. Many of them stop, too, for he operates a popular motel and restaurant at Walnut Ridge, Ark., on the main highway between Little Rock and St. Louis. He finds time to put his dreams into production.

As a member of the Arkansas Game and Fish Commission, he saw the recreation possibilities of part of the Lawrence County Soil and Water Conservation District. He got the wheels rolling. Later, as a member of the district board, he saw his dream come true.

Now the Flat Creek Watershed Project boasts one of the finest multipurpose developments in the State, and the first with major contributions from several State and Federal agencies and the local people. The largest reservoir—600 acres—and the 80-acre recreation area on its shores are named Lake Charles for him.

Marlow, Okla., now has a new water supply because its mayor, the late J. W. Taylor, served coffee and conservation over the counter of his restaurant.

"I think we voted for the project in self-defense," said Horace Wood, another businessman. "He called it 'our Marlow lake,' but there was so much of J. W. in it that we couldn't name it anything but Lake Taylor." The reservoir is a multipurpose structure on Rush Creek, a subwatershed of the Washita River Flood Prevention Project, in the Grady County

Otey Sherman named the watershed lake on his land for his neighbor, Mrs. Martha Rainey, who helped in securing easements for the project in the Tallahatchie Soil Conservation District, Mississippi. A sign (right) honors the Mayor of Marlow, Okla., who marshaled support for the lake that now bears his name.



Soil and Water Conservation District.

Two large reservoirs, Lake Fuqua and Lake Humphreys, near Duncan, Okla., in the Stephens County Soil and Water Conservation District, have been named for two prominent businessmen who were responsible for much of the successful watershed activity in the area. Both men spent much time and money to see the watershed program of the Wildhorse watershed, a subwatershed of the Washita River Basin, to a successful fulfillment.

Nolan J. Fuqua, a former president of the National Association of Soil and Water Conservation Districts, and "Watershed Man of the Year" in 1964, is chairman of

the Stephens County Soil and Water Conservation District board of supervisors, and executive director of the National Soil Conservation Districts Foundation.

Lawrence J. Humphreys is board chairman of the Security National Bank of Duncan.

Dr. Church Lake is the name of a multiple-purpose reservoir on the 175,360-acre Foureche Maline Creek watershed which stores water for the city of Wilburton, Okla. Dr. Church, a dentist and rancher at Wilburton, has been a member of the Latimer County Soil and Water Conservation District board of supervisors since 1952, and is also immediate past chairman of the Oklahoma Water Resources Board. ♦

Roadside conservation

(Continued from p. 130)

A recent development at the national level is a cooperative effort between SCS and the Bureau of Public Roads under the Federal Highway Act of 1966. SCS has assisted the Bureau in developing guidelines for minimizing soil erosion from highway construction.

A joint effort of county representatives of the Extension Service, vocational agriculture teachers, the State conservation department and highway commission, and SCS is putting a selective brush management program into effect in Wisconsin. This program started in 1965 and is the result of a study of right-of-way management in Columbia County. The objectives of the program are to control erosion and improve scenic values and habitat for wildlife and beneficial insects. To date, 80 miles of roadsides have been treated in 35 soil conservation districts. Nineteen different organizations, including State and local government agencies, public utilities, and private commercial concerns, have participated in the cooperative project.

The progress made by local, State, and Federal authorities during the last 10 to 15 years in stabilizing roadsides has contributed much to reducing the sediment and debris reaching the Nation's streams and lakes. But the job is by no means completed, nor are there answers to all the problems. There are new plants to be tested and new methods of establishment and maintenance to be tried. There is work to be done in every governmental jurisdiction in the country. ♦

Landforming

On uneven fields where landforming is not practiced, water runs off the high areas and collects in shallow depressions.

Boys Town wins 1967 State farm award

Soil and water conservation work on the farm at Boys Town, Nebr., has won for the institution the top place among the 1967 Award Farms in the statewide program sponsored annually by the Nebraska Association of Commerce and Industry.

Each of Nebraska's 86 soil and water conservation districts parti-

cipate in the program by submitting a colored aerial photo of a district award winning farm. Boys Town won in the Douglas Soil and Water Conservation District in 1966 and in the State in 1967. Below is the presentation photo.

Boys Town conservation work was described in the May 1967 issue of *Soil Conservation*. ♦



Diversions and ditches lead flood water safely through Oregon town

By George Hamlin

Soil conservationist, SCS, Harrisburg, Oreg.

Farmers, city people, and Government agencies pooled their resources to lick floods on farm and city property at Harrisburg, Oreg., on the east bank of the Willamette River. City and school district officials, representatives of the Linn-Lane Soil and Water Conservation District, the Harrisburg Planning Commission, and the Soil Conservation Service all had an interest in the project.

A series of meetings was held at which a project and ways to cost-share its construction were discussed.

A tentative commitment was obtained for Federal matching funds to 70 percent of the cost for that part of a project which qualified as agricultural land. It was pointed out that this was a special pilot project that emphasized additional fringe benefits to go along with the basic agricultural conservation benefits.

A cooperative project

On the local front, 28 co-operators signed the working agreement with about half of them contributing to the financing of the project. The county court, city of Harrisburg, the Union High School and Grade School districts, as well as individuals contributed to the project.

The project consisted of a system of open and closed ditches and pipes laid out to divert part of the water before it entered town and to speed up flow of water that went through town.

The diversion was simply an interceptor ditch that cut off flow from the south and carried it west into the Willamette River. This

water had to pass through a dike south of town. A culvert with a floodgate was installed to let the water flow out when the river is below the culvert and stop water from flowing back when the river rises above the pipe.

The rest of the system is a series of open and closed ditches and pipes designed to carry the rest of the load with extra capacity when the floodgate on the diversion is closed.

More than 3,900 feet of open ditch and 7,400 feet of tile were installed. The tile ranged from 6- to 24-inch concrete. Two catch basins, three inspection basins, and one floodgate were included in the project.

Rural and urban benefits

The areas benefited included 620 acres of cropland, 104 acres of pasture, 160 acres of residences and commercial property, 30 acres of school land, and two churches on 6 acres. There are 12 farms in the watershed with from 10 to 200 acres each; city residents numbered 32 and schools two. Much of the pipeline was installed on or adjacent to the school's athletic fields and playgrounds for health and safety reasons.

The initial part of the project was tested when a storm dumped 3.31 inches of rain in 24 hours. The system was designed for 1.75 inches. Four to eight inches of water flooded some areas, but no property damage was reported.

Recently, a new, larger tile was added to the system, along with more interceptor ditches, to speed up removal of surface water flowing through town. Also screens cov-

ering inlet structures were changed to prevent clogging by wood chips from trains. A sloping screen that allows chips to slide up as the water rises solved this problem.

Total cost of the project, designed by the Harrisburg Work Unit of the Soil Conservation Service, was about \$15,000. The Government shared \$9,380 of the cost through its Agricultural Conservation Program. The rest, nearly \$6,000, was borne locally. ♦

Pinon-juniper sales pay for clearing

Selling fire logs and seedling trees of pinon pine and juniper, which have invaded deep soils on his rangeland, is proving to be profitable for Joe Crump, cooperator with the Upper Huerfano Soil Conservation District in Colorado. He is also a participant in the Great Plains Conservation Program.

The pinon pine and juniper needed to be removed from several hundred acres of bottom land on Crump's cow, calf, and sheep ranch to improve the range.

He has sold fire logs to camps in a summer resort area near Walsenburg, in Denver and Colorado Springs, and in Garden City, Kans.

He sells seedling trees to nurseries from Denver and Colorado Springs. The buyers come to the ranch and ball the trees for ornamental purposes.

Mr. Crump has cleared some 200 acres of land, bulldozed branches from the trees into gullies to prevent further erosion, and broadcast native grass seed over the entire area. Enough trees have been sold to pay for removing the brush.—JOSEPH J. ALESSI, *work unit conservationist, SCS, Walsenburg, Colo.* ♦

Agri-Business Complex

The agri-business complex now engages three-tenths of all employed persons in the United States. ♦

Great Plains Program helps group control erosion

Farmers and ranchers working together and using assistance from the Great Plains Conservation Program are a hard combination to beat when it comes to solving difficult soil and water conservation problems.

An outstanding example of success through cooperation can be found in the Cottonwood Group in the Cap Rock Soil and Water Conservation District of Texas.

This group consists of five individuals who own about 12,212 acres of range and cropland in Briscoe County. All have Great Plains Conservation Program contracts, and all are within a small watershed. Land treatment in the group could not be applied satisfactorily except in sequence, farm by farm, from the top of the watershed down.

All work has been done since February 16, 1960, when E. A. Birdwell, who farms at the top of the watershed, signed his Great Plains Conservation Program contract. Most of the application work in the group is completed.

In addition to the land treatment for each acre of land, the complete treatment will control a huge gully in the lower part of the drainage area that local people call a "baby grand canyon." Control of this gully was one of the jobs that could not be done without the combined efforts of the group.

Included in the Cottonwood Group in addition to Birdwell are Walter Graham, J. T. Rogers, Jr., Gerald Smith, and J. R. Stroup. Together they operate 1,526 acres of cropland and 10,686 acres of rangeland, a total of 12,212 acres.

In their joint conservation program, they have built 44.8 miles of terraces, 2.6 miles of diversions, four ponds, and two erosion-control dams; installed five livestock water facilities; and completed 3,168 acres of brush control.

One of the erosion-control dams



The "baby grand canyon" in the Cottonwood watershed is being brought under control by dams on the upper reaches and grade stabilization downstream. The large irrigation reservoir on the Walter Graham farm withstood heavy flooding and has produced many unexpected benefits such as springs developing in the creek below and grass growing shoulder high in the valley.



also serves as an irrigation reservoir holding water to irrigate about 320 acres. The structure will reduce flooding in the watershed.

A pooling arrangement was executed and signed by all the producers. The agreement (1) specified the benefits each producer would receive and the distribution of the Great Plains Program cost-sharing payments, and (2) defined the maintenance responsibilities of each producer participating. The agreement was filed in the county clerk's office for a permanent record.

Total cost-shares paid by the

Great Plains Conservation Program on all practices in the watershed will amount to about \$28,277 or \$2.30 per acre. The contribution made by the group far exceeds the expenditures made by the Great Plains Conservation Program. Besides a lot of money, each individual has donated equipment, labor, and time in planning and applying the permanent conservation measures.

Also, each one carries out the management practices that supplement the applied treatment.—JAMES D. ABBOTT, assistant State conservationist, SCS, Temple, Tex. ♦



Tommy Johnson (left) shows SCS Work Unit Conservationist Yoakum the peanuts he planted on the protected flood plain below floodwater-detention structure.

Flood control benefits farmer

Experience gained working on upstream flood-prevention structures gave Tommy Johnson of Pontotoc County, Okla., a good understanding of how they are built and how they can stop flooding in a watershed. It also made him glad he has structures on his own farm in the Leader-Middle Clear Boggy Creek Watershed Project.

Johnson now has two flood-control reservoirs on his 160-acre Leader Creek farm. He rents three other farms on the flood plain, and he estimates that the reduction in flood damages will amount to around \$5,000 annually in benefits to him. The structures control about 2,240 acres of drainage area.

Many of Johnson's friends, neighbors, and relatives enjoy the good fishing provided by the 6- and 20-acre permanent pools of the two lakes. The Johnsons themselves haven't done much fishing, but the success of other fishermen has recently made them eager to try their own luck.

"The men from the Soil Conservation Service helped me develop a conservation plan for my farm in cooperation with the Pontotoc County Soil and Water Conservation District," says Johnson. He added that he urged others to support the district program.

Walter Woolley, Jr., conservation district supervisor, encouraged

Johnson to grant necessary easements so the lakes could be built.

Mr. Johnson says, "I was reluctant to give the needed permission, but Woolley would have a lot harder time now, if he needed my permission to have the structures removed." — KENNETH YOAKUM, work unit conservationist, SCS, Ada, Okla. ♦

Improved grasses to mend range

Improved grass strains developed by the Soil Conservation Service have been put to work to restore a unique area of rangeland in one of the largest extinct volcanic craters in the world.

The Baca Land Cattle Company is testing 14 varieties of grass to find the ones best suited for reseeding former cultivated land in Valle Grande, a beautiful valley of the crater in the heart of the Jemez Mountains in northern New Mexico.

About one-third of the ranch area is open pasture, with the rest in timbered mountain slopes. The growing season is short—120 days or less—but the summer range offers near-perfect conditions for growing steers.

When Pat Dunnegan and his associates purchased the ranch, they promptly undertook a soil and water conservation program. Soil Con-

servation Service technicians, working with the Jemez Soil and Water Conservation District, assisted Dunnegan develop his plan, and a good start has been made in applying conservation practices.

A former owner of the ranch had tried farming part of the valley, and about 600 acres were plowed and planted for several years. Crop choices were limited because of the short growing season and cool summer nights.

After the farming venture was abandoned, inferior grasses and weeds covered much of the plowed land. Too many sheep and cattle kept out the better forage.

Improving the vegetation was given a high priority in the conservation plan. Because there was little information based on local conditions of the unique area, a plan was developed to establish trial plantings on the site.

District Supervisors Simon Garcia (left) and Telesfor Gonzales examine hay produced on the trial planting of intermediate wheatgrass in Valle Grande.



A 13-acre plot was selected and seeded to promising grasses.

Sample clippings have been made twice a year since 1964 to determine which grasses produced the most forage. Intermediate wheatgrass consistently produced higher yields than all others and had higher protein content.

By the spring of 1965 a decision had been made to plant 600 acres of Greenar and Amur strains of intermediate wheatgrass and alfalfa. In 1966 another 200 acres

was planted with the same mixture.

The higher elevations on the ranch were little used because of poor water distribution and lack of cross fences. To improve the grazing, 20 stock water ponds were built, and more are planned. Also, several miles of cross fences have been planned.

Deer and elk appear happy with the new forage and the watering holes.—RICHARD L. BARBER, *work unit conservationist, SCS, Bernalillo, N. Mex.* ♦



The Potomac. BY THE POTOMAC PLANNING TASK FORCE. 1967. U.S. Dept. of Int. 103 pp., illus.; square album format. \$5.00.

Subtitled "A Report on Its Imperiled Future and a Guide to Its Orderly Development," this document was prepared for the Secretary of Interior by a group of distinguished men assembled by the American Institute of Architects.

It is one of several supplementary studies made in response to the President's directive to the Secretary to review past planning efforts in the Potomac Basin and develop a plan for the preservation and orderly development of the basin's resource "as a model of scenic and recreation values for the entire country." The comprehensive report based on all the studies is expected to be submitted to the President early in 1968.

Although the charge to the task force suggested a review of all facets of the basin's resources, the group wisely confined most of its attention to the "mounting pressure on the few remaining natural amenities."

The report gives passing consideration to water resource and agricultural problems. The accent here is mainly in relation to the metropolitan area and some other centers of population in the basin, with minor attention to the needs of the people in the smaller upstream areas.

In discussing the need for broad land use planning in the basin, the task force wisely argues that decisions should be based on inventories of streams, lakes, and aquifers and studies of terrain and soils that would indicate the areas best adapted to agriculture, forestry, recreation, and water production. It was seemingly unaware, however, of the substantial amounts of

Meetings . . .

Grassland conservation among topics at stockmen's convention

More than 2,000 stockmen from about 42 States will gather in Oklahoma City January 21 to 24 for the 71st Annual Convention of the American National Cattlemen's Association.

Marketing, "consumer reaction," legislation, nutrition and production research, and sound range management will be among the major topics considered by the ranchers, breeders, and feeders in committee sessions and speaking programs.

SCS Administrator D. A. Williams will appear on the general program. He will discuss the importance of conservation and development of grazing lands to stockmen, communities, and the Nation. Persons interested in soil conservation or beef cattle production need not be members of the association to attend.

Wool growers talk of rangeland use

Improving the sheepman's bargaining position at the marketplace will be the topic of discussion at the 103d annual convention of the National Wool Growers Association, January 28-31, in Dallas, Tex.

Other topics include sheep production research, promotion and

advertising, public land use, rangeland conservation and development, predator control, and labor problems.

Dr. Charles W. Jarvis, the "Flying Dentist" of San Marcos, Tex., will head the speakers at the annual banquet on January 30.

About 800 delegates from across the Nation are expected to attend the convention.

Dates and places

January 21-24, American National Cattlemen's Association, Oklahoma City, Okla.

28-31, National Woolgrowers Association, Dallas, Tex.

February

4-8, National Association of Soil and Water Conservation Districts, Dallas, Tex.

11-16, American Road Builders Association, Las Vegas, Nev.

11-16, American Society of Range Management, Albuquerque, N. Mex.

17-21, American Association of School Administrators, Atlantic City, N.J.

21-23, American Pulpwood Association, New York, N. Y.

21-23, Land Improvement Contractors of America, Sioux Falls, Iowa.

information about these items already available from detailed studies that have been going on for years.

It is evident that the group was on more familiar ground in dealing with the problems of the urban Potomac, described as the "critical 30 miles" centered in the Washington metropolitan area. The report suggests a number of specific actions to preserve and enhance the riverside. The Georgetown and Anacostia waterfronts, for example, could be redeveloped with continuous promenades along the river's edge, and a system of long narrow converging parks adapted to mobile forms of recreation.

The report contains some pertinent observations about the relationships of highways and river crossings to the scenic values of the riverside. It suggests that arterial highways be located well away from the river to relieve the pressures for development. Parkways for pleasure driving should be set back, using spur roads to exploit the scenic resources of the area.

The task force estimates that future suburban expansion will significantly alter the Potomac landscape for a distance of 35 miles from the center of Washington, about three or four times the present radius. Zoning is regarded as essential to orderly development. Large and well-selected natural areas should be preserved within the metropolitan district which will accommodate the increasing population in residential clusters and new towns. Agriculture must have its appropriate place in the basin with due regard to proper management of other resources, and the report also suggests some new forms of zoning to protect farmlands and forests. It says:

"Management of development is mainly the responsibility of State and local governments, but they should respond to enlightened concepts that replace the inadequate and misguided development controls now in effect."

The ingredients for a desirable environment can no longer be taken for granted. Pure air, clean water, quiet open spaces, and a balanced community have a price tag. Accordingly, the question of the Potomac's future comes down to how much are we willing to pay for what we agree is desirable.

To this end the task force recommends that a Potomac Development Foundation be established, to be headed by an administrator appointed by the President and assisted by a planning staff and an officially appointed professional advisory board. It would not be a construction, operation, or management agency but would provide stimulus, leadership, and expert advice in all phases of planning in the basin.

In the view of the task force, planning and proposals for development of the basin's resources have been largely piecemeal and uncoordinated in the past. "We believe it is necessary," the report says, "to view the river from a unifying point of view. If this can be done, hundreds of pressure groups and special interest organizations may be able to work together. Otherwise limited viewpoints will prevail and the river environment will continue to be a byproduct of tugging and hauling, bickering and controversy."—CARL D. FETZER, *River Basins Division, SCS, Washington, D.C.*

Outdoors USA: 1967 Yearbook of Agriculture. 1967. U.S.D.A. 408 pp., illus. \$2.75.

Outdoors USA, the 1967 Yearbook of Agriculture, is designed for all who care about the quality of their environment—citizens concerned about the conservation and protection of natural resources, hunters and fishermen, campers and hikers, young people learning about the outdoors, and landowners interested in income-producing recreation. This is an exceptionally attractive yearbook, well illustrated with both color and black and white photographs.

In the press premiere introducing *Outdoors USA*, Secretary of Agriculture Orville L. Freeman said, "Outdoors USA is indicative of the broad conservation functions of the Department of Agriculture. It is the latest salvo in our battle to rejuvenate and revitalize all of rural America for all our people."

In the foreword, the Secretary writes that the Department is "moving forward with bold new actions to restore, conserve, and wisely use our natural heritage and maintain it for future generations." Secretary Freeman also noted that about half the Department's staff works in some phase of conservation to preserve natural resources while getting the most use from them.

Soil Conservation Service personnel authored 28 of the more than 100 articles dealing with adventure, beauty, and the people involved in outdoor activities. The four major headings are: "The Big Woods," "Water," "Beautification," and "The Countryside," with a wide variety of titles to arouse your curiosity, such as "More Crawfish for the Gourmet," "Small Watersheds Make a Big Splash," "Shunpiking Is For Fun," and the like.

Regardless of your conservation interest, whether you are on the firing line or the support staff, a soil conservationist or a specialist, a hunter or a hiker, a camper or a photographer, you will find numerous articles in *Outdoors USA* to engross your attention.—CHARLES G. PHILLIPS, *Resource Development Division, SCS, Washington, D.C.*

New publications

Our American Land. By SOIL CONSERVATION SERVICE. 1967. U.S.D.A. Agr. Inf. Bull. 321. 29 pp., illus. \$0.20.

Our American Land provides a much-needed updating of the soil conservation story and the part of the Soil Conservation Service in it. It gives the SCS employee a

publication that he can use to tell his public the kind of job he has and the kind of crusade he is in. It explains briefly how SCS got started, what the Nation's soil and water conservation problems are, and what is being done about them.

This publication relates briefly the history of soil erosion through the development of this young Nation. "To the pioneers our land seemed unlimited . . . We tend to think of their migrations as exploitation . . . but the pioneer farmer had to cut the timber and plow the sod to produce food."

Conservation districts are discussed enough to relate their development and growth to SCS as a Federal action agency that works right on the land with the land users and operators.

Soil surveys, soil and water conservation practices, small watersheds, and farm and ranch plans are treated concisely.

Our American Land suggests a look into the future. It points out that, while America's farmers are producing food more abundantly than any others on earth, they are not doing so without cost to the land; much of our high crop production comes at a high cost in soil washed and blown from the fields.

The booklet touches also on SCS's role in orderly urban expansion and community development and on the increasing pressures for land for other nonfarm uses. Conservation is a program not for farmers alone but for the entire Nation.

Evaluating Flood Prevention in Upstream Watersheds With an Areal Point Sample. BY GORDON SLOGGETT AND NEIL R. COOK. 1967. *USDA Econ. Res. Serv. ERS-353*. 24 pp., illus. An interim report, it describes progress achieved to January 1, 1967, toward evaluating the major economic benefits of flood prevention on 11 watersheds in the central part of the Washita Basin, and is limited to data collected in 1964-65.

The Agricultural Research Center. Revised 1967. *USDA Agr. Inf. Bull. 189*. 36 pp., illus. \$0.30 An updating of a familiar descriptive pamphlet.

Soil Conservation Service. 1967. *USDA PA 818*. 8 pp., illus. A folder telling briefly the functions of the SCS and presenting something of its background.

A center-spread map shows the area served through soil and water conservation districts, and the general locations of other SCS activities: resource conservation and development projects, Great Plains Conservation Programs, and watershed projects of various types.

Food and the Land. 1967. *Soil Conserv. Soc. Amer. Ankeny, Iowa*. 16 pp., illus. \$0.25. A cartoon booklet in color presenting the soil and water conservation story in the world food crisis. This is another of the cartoon booklets published by the Society as part of its effort to provide educational tools in the conservation programs underway on the land in the United States, Canada, Puerto Rico, Mexico, and elsewhere.

Fertilizer Use in the United States, By Crops and Areas. BY D. B. IBACH AND J. R. ADAMS. *USDA Econ. Res. Serv. Stat. Bull. 408*. 384 pp. 1964 estimates.

Open Space Land, Planning and Taxation. BY JOHN E. RICKERT, WITH THE COLLABORATION OF JEROME P. RICHARD. 1965. *Urban Renewal Administra-*

tion, Housing and Home Finance Agency. 58 pp. \$0.40. A selected bibliography.

Soil Surveys

Warren County, Tennessee. BY GEORGE T. JACKSON, SAMUEL R. BACON, JAMES F. BRASFIELD, DONALD B. FREEMAN, AND IVAL D. PERSINGER. 1967. 79 pp., illus.; maps 4 inches to the mile (1:15,840).

Adams County, Washington. BY CHARLES D. LENFESTY. 1967. 110 pp., illus.; maps 3.17 inches to the mile (1:20,000). Fieldwork by Charles D. Lenfesty, Roy H. Bowman, Jesse J. Newlun, Dale L. Olson, Norman C. Donaldson, Dale E. Snyder, Ronald D. Iverson, and Robert A. Hardin.

Bremer County, Iowa. BY RUSSELL L. BUCKNER. 1967. 118 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by Russell L. Buckner, Edward L. Bruns, Garwin T. Carlson, William L. Fouts, Wayne D. Frederick, Ellsworth M. Richlen, David F. Slusher, Kermit D. Voy, Wayne Arnold, James S. Brasfield, and J. Millard Soileau.

Randolph County, Alabama. BY WILLIAM B. PARKER. 1967. 69 pp., illus.; maps 4 inches to the mile (1:15,840). Field survey by William B. Parker, Billy D. Batchelor, Oliver R. Carter, Lewis A. Dungan, and Harold L. Mathews.

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



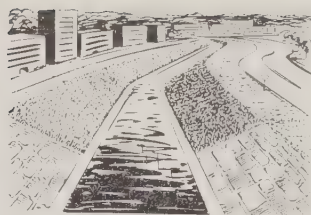
America The Beautiful—Nevada

USDA SOIL CONSERVATION SERVICE
IMPROVED ALTA FESCUE PASTURE AND LINED IRRIGATION CANAL, PAHRANAGAT VALLEY
SOIL CONSERVATION DISTRICT

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From the Administrator:

The Erosion Threat to Water Resources



Sediment is by all odds the major pollutant in the Nation's water supply. Studies on the Potomac River Basin show that gross erosion in the basin is more than 50 million tons annually. Of this amount, 2.5 million tons are discharged in the Potomac estuary. The estimated costs of dredging this sediment is \$0.90 to \$1.25 a ton.

The discharge of sediment into water supplies was formerly considered to result from erosion on farmlands. It is recognized now that unprotected roadsides, unstabilized streambanks, unreclaimed surface-mined lands, and rural-fringe areas—particularly areas of new construction—are major sources of sediment pollution.

Excessive sediment is harmful to essentially all beneficial uses of water. The costs for filtration of water for domestic and industrial uses generally exceed all other costs. Sediment smothers and inhibits aquatic life and greatly reduces the recreation potential of the Nation's lakes, streams, and reservoirs.

Water moving over and through the surface soil picks up natural salts and mineral substances. Drainage from acid mine wastes is an example of this type of pollutant. The pH of water in streams which carry mine drainage is consistently below 5 and frequently 3 or lower. The Monongahela River in West Virginia and Pennsylvania is acid over its entire 129-mile length and contributes, on the average, the equivalent of 200,000 tons of sulfuric acid a year to the Ohio River at Pittsburgh.

Streams in arid and semiarid regions may have large quantities of salt from the lands they drain. Samples of water from the Pecos River in Texas show concentrations as high as 15 tons of dissolved salt per acre-foot of water during low flows.

What does all this mean to us in the Soil Conservation Service? No one has answered the question better than Secretary of Agriculture Freeman. In *Resources in Action: Agriculture/2000* he said:

"Pure air, clean water, stable soils, productive crop, pasture, range and forest lands, abundant wildlife, natural beauty, and the opportunity for man to live in harmony with his natural environment are essential. They are interrelated and mutually supporting objectives. We commit ourselves to meet this great challenge, to continue our tradition of helping men throughout the world to help themselves, and to move forward with the bold new actions needed to restore, conserve, and wisely use our natural heritage and maintain it for future generations."

Fortunately, the Service has a wealth of experience and skill in dealing with soil, water, plants, and animals—the basic resource elements in our environment. Limited as the programs are for dealing with roadsides, streambanks, and surface-mined areas, we have knowledge and skills that can be applied to these sources of sedimentation and pollution.

All sources of sediment must have unified, coordinated attention if we are to overcome this threat to the Nation's water resources. Whether the sediment source is

farmland, surface-mined land, roadsides, streambanks, or construction in rural-urban fringe areas, the greatest progress can be made when all interests, public and private, in a drainage area unite in their efforts. Attempts to deal with the problems piecemeal are costly and in many instances ineffective.

Moreover, the preventive measures to control erosion and sedimentation should not be taken without consideration of positive efforts for beneficial use of the lands involved. In most instances, the damages avoided can be matched by new values created by constructive conservation measures.

Much attention has been given in this country to the multiple use of land. This usually has meant *simultaneous* use of the same area for different purposes: camping on tree land, hunting on pasture or hayland, fishing in irrigation reservoirs, and the like. More consideration should be given to *sequential* multiple use: tree growing followed by surface mining for fuel or minerals followed by tree growing again, or by production of pasture and hay for livestock, or by recreation based on water developments or improved wildlife habitat.

By good planning and effective conservation of natural resources in the broadest sense, surface mining in most instances can be made compatible with later uses of affected land.

As soil conservation district supervisors, land use planning boards, and other local officials look to the future, these opportunities loom large.

Theirs is the responsibility to develop public understanding of the problems, the role of Federal, State, and local jurisdictions, and, most importantly, of the private sector in meeting head-on the challenges of the future.

D. A. WILLIAMS

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Colorado district guides growth of Ski Purgatory

Carefree skiers who schuss through the powder at Ski Purgatory in southwest Colorado aren't thinking of soil conservation. But, if one stopped to ask Raymond Duncan or Chet Anderson, ski enthusiasts and developers of the resort, they could tell him how Purgatory was developed according to a conservation plan.

Duncan and Anderson, as co-operators with La Plata Soil Conservation District of Durango, began work on the idea in the summer of 1965. SCS soil conservationists helped them plan and install a diversion ditch to intercept a small creek and transport it without erosion from the ski slope area.

By the fall of 1965, the clearing of trees and brush from ski slopes and trails had opened the way for soil erosion. The second job, then, was to establish grass as a protective cover over all of the skiing areas. Whirlwind seeders were used to dispense smooth brome-grass and intermediate wheatgrass on the steep slopes. A break in the weather resulted in good growing conditions during 1966, and now summer visitors, who ride the chairlift, look down on slopes carpeted with green grass.

Plans for the near future include a lake stocked with trout and picnic facilities for tourists who would rather visit Purgatory during the summer than tackle the slopes when the snow starts falling.

Cooperation between the district



A plan for year-round recreation at Ski Purgatory, north of Durango, Colo., will extend this slope's invitation to skiers into the summer for picnickers.

and the resort will continue in the future as more areas are cleared and ski slopes developed to handle the growing crowds of visitors.

By the end of the 1966-67 ski season, Purgatory has had 64,000 visitor days. Of this number, 54,000 were ski days. Along with local visitors, people came from Arizona, California, New Mexico, Texas, Oklahoma, and Utah.

Ski Purgatory has done much to help the economy of Durango, especially by bringing in business during the winter months. The manager of a prominent hotel stated that December was so busy he was unable to get away to ski.—EUGENE MCGUIRE AND ROBERT GRIFFIN, *work unit conservationist and area conservationist, SCS, Durango, Colo.* ♦

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FEBRUARY 1968

Vol. 33 No. 7

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



THE DISTRICT OUTLOOK
AND
COMMUNITIES OF TOMORROW

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A cluster of high-rise apartments and town houses in a rural setting typifies a new concept of suburban development. The "new town" of Reston, Va., was planned with assistance from the Northern Virginia Soil and Water Conservation District.

Outlook . . .

The searching look ahead at resource conservation problems and prospects that has come to be known as the "District Outlook" is having increasing effect on events across the Nation.

Soil Conservation has recorded the growing trend toward broader responsibilities for what were originally simply "soil" conservation districts. Since 1962, five-sixths of them have broadened their programs and signed new working agreements with the Department.

We present this month an appraisal of progress by district officials (pp. 147, 152, 154, 158).

Dual thrust: When we invited these conservation leaders to tell their story, we did not know that the Secretary of Agriculture's new statement of Department policy on rural communities would be available for review at the same time.

Happily it is, and Deputy Administrator Norm Berg's interpretation (p. 149) of *Communities of Tomorrow* reveals the parallel thinking of Department and district leadership.

Report: Each year more and more of our effort goes into consultative and planning activities that do not show results in the traditional measures of work on farmland that make up the bulk of the table on pages 162-164. The narrative summary of activities (p. 160) reflects the increasing emphasis on the economic and human benefits of conservation.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOIL CONSERVATION is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of the publication was approved by the Bureau of the Budget July 25, 1963.

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An Experiment That Worked

By Sam S. Studebaker

President, National Association of Soil and Water Conservation Districts, Tipp City, Ohio

Thirty years ago the Nation embarked on a unique experiment in self-government. And it worked.

The problem was soil erosion, symbolized by the dust from the Great Plains that swirled in the streets of the capital city. The proposed solution was a network of new local governments, authorized under State law, that would encourage voluntary action by farmers, ranchers, and other landowners to preserve our soil and other natural resources.

The soil conservation district was an experiment in democracy, a proposal that a partnership be formed between the localities, the States, and the Federal Government to wage war against soil erosion. The success of the experiment is well known, and the evidence is written across America's countryside.

As in any social innovation of such dimensions, the results were not the same in all instances. Local decision was the fundamental principle of the program, and local people in different areas interpreted their resource problems differently.

When 48 State legislatures looked at the model legislation transmitted to the governors by President Roosevelt, they saw the opportunities for progress in terms of their own experience. They modified the suggested enabling law, often substantially.

The early soil conservation districts were organized with the problems of agriculture—and soil erosion in particular—in mind. Later this limited view gave way

to a growing concern with water management and the need to provide services on a coordinated basis to groups of landowners as well as to individual farmers and ranchers.

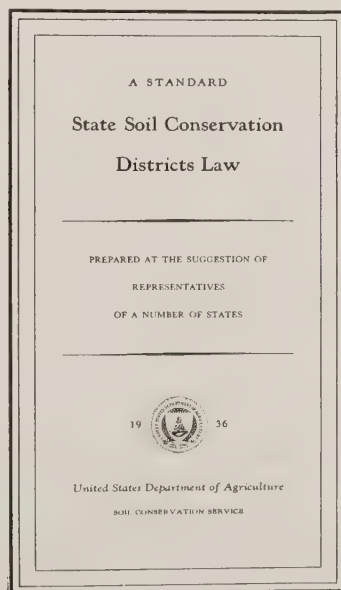
The evolution continued until today we see many soil and water conservation district officials wrestling with the application of soils data to urban waste-disposal problems, the sponsorship of upstream watershed projects which store water and prevent floods, the need for technical assistance to help develop recreation facilities on private land, and the interrelationships between resource development and economic growth.

Farm conservation plans and their application are still fundamental goals of every soil and water conservation district in the country. But for most districts, there is a whole additional range of resource problems to be faced.

Attention is shifting toward development of private as well as public land for recreation, toward the mitigation of damages to resources from construction, toward the prevention of pollution, and toward the requirements of the resource user as well as the needs of the resource owner.

It is no wonder district programs have changed. They've had to, because the times have changed.

More growth and change are on the way. Three years ago, the National Association of Soil and Water Conservation Districts appointed a Special Committee on District Outlook. Its purpose was



to assess what changes needed to be made to strengthen district programs across America.

Under the leadership of John Wilder of Somerville, Tenn., now NACD's national vice-president, the committee concluded that districts need to broaden their purposes, take on new responsibilities, give more attention to the interrelationships between resources, make new allies among other resource interests, join hands with town and city people, finance their programs more adequately, and secure powers needed to carry forward a wider range of resource work in their States.

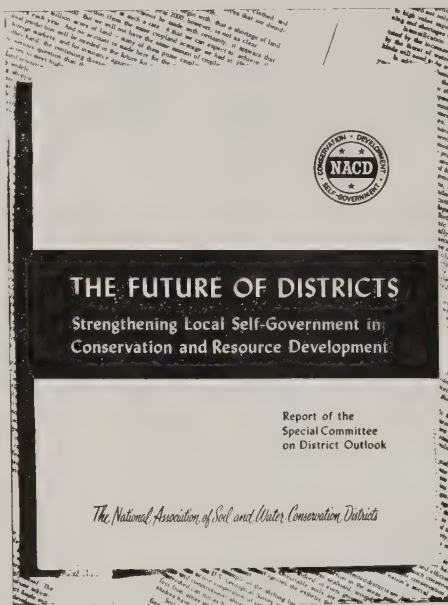
The evolution of districts has to be continued, said the committee in its report entitled *The Future of Districts*, if they are to continue to fulfill their promise of local self-government. District leaders across the country agree.

Districts, they said, have the experience and capabilities to do more in the broad resource field than any other existing organization. Their supervisors are knowledgeable in land and water management. The services available to districts from State and Federal agencies under a variety of cooperative agreements is unequalled. If districts fail to take on the new tasks of conservation and resource development, they said, either new units of government will be formed or some less qualified agencies will begin to operate in the field.

Several States have already taken action. Among those that have already amended their State district enabling laws to strengthen and broaden their programs are Arkansas, Colorado, Connecticut, Florida, Louisiana, Massachusetts, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Mexico, New York, Pennsylvania, South Carolina, South Dakota, Texas, Vermont, and Washington. Already over a dozen States plan to introduce bills to strengthen the districts and State soil and water conservation committees, commis-

sions, boards, and councils.

The proposals cover a variety of subjects, including the incorporation of urban lands within district boundaries, nonfarm representation on district governing bodies, much closer cooperation with county governments, broader responsibilities for State committees and districts, improved financing



through State and county appropriations, and new powers needed to carry out watershed and other resource development projects in specific areas more efficiently.

Equally as promising as the action on the legislative front are the new policies being adopted by individual districts throughout the country. Some have prepared proposals to help halt stream pollution. Others have organized sediment-reduction programs to keep the material eroding from construction sites from clogging lakes, reservoirs, and stream channels.

Districts are providing technical assistance with recreation projects, laying out canoe trails, helping community planners reserve suitable lands for agricultural and open space purposes, and working to coordinate new highway construction and the conservation work on adjacent lands.

Administrative improvements are also a part of the district-strengthening process. The employment of district administrative personnel is proving popular in several parts of the country.

New memorandums of understanding are helping to achieve mutual planning of resource improvements on intermingled public and private lands and have set the stage for cooperation in cost-sharing, recreation, and economic development programs. And the State committees are offering new services to districts in program planning, educational support, budgeting, and staff assistance.

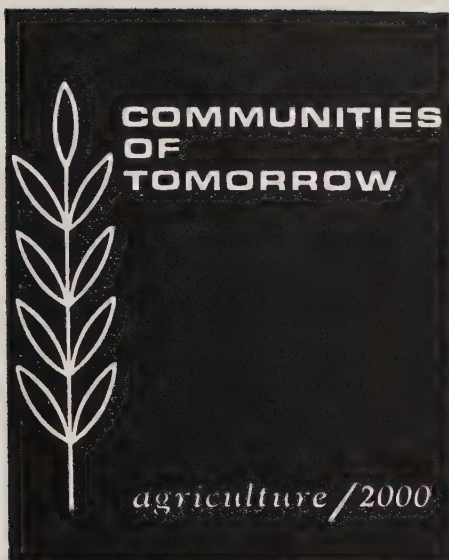
It is clear from the new and imaginative work going on in the country's 3,005 districts that *attitudes* count for as much in "district outlook" as *amendments*.

The challenges that face soil and water conservation districts today are not solely those involving the physical resource problems. Equally as significant are the challenges to the principle of self-government.

Like democracy, self-government is an ideal—something to be approached, but probably never to be wholly attained. Yet self-government motivates the 18,000 district supervisors, directors, and commissioners serving their communities today. Districts were founded on the idea that local citizens should have an opportunity to influence the course of natural resource affairs that affect them substantially in their home communities.

In an age of bigness—in government, business, and the world of ideas—the ideal of local self-government is often difficult to maintain. Yet it is essential to the fabric of American life, and the soil and water conservation district is one of its most successful manifestations.

The evolution of districts—an experiment that worked—must continue. It will continue, because the challenge is too great to be ignored. ♦



Communities of Tomorrow

By **Norman A. Berg**

Deputy administrator for field services, SCS

When the leaders of soil and water conservation districts charged their membership to examine and document "The Future of Districts"—an effort that resulted in a report of that title by the Special Committee on District Outlook—the action had special meaning for the Soil Conservation Service.

In a parallel exercise in self-examination, the Department of Agriculture has restated its policies for conservation and community development in the years ahead in two publications, *Resources in Action* and *Communities of Tomorrow*. The latter, just released, is a new guidepost both for the Soil Conservation Service and for conservation districts.

SCS has long recognized that the responsibilities and opportunities for districts are rapidly broadening. We know that districts are an ideal mechanism for implementing the many actions needed now to build the hoped-for Agriculture/2000 and that progress is greatest where district officials and Federal conservationists work together as a team.

Key to accomplishment

A recent study in one State of the major characteristics of high-producing SCS work units led to this conclusion:

"It was not apparent whether the district governing board members were active and enthusiastic because of the work unit personnel, or the work unit personnel were active and enthusiastic be-

cause of the supervisors. There is no question about the beneficial effects an energetic, active board of supervisors and a work unit staff have on each other as well as on the overall conservation activities."

This finding emphatically confirms our long-held conviction that the effectiveness of much of SCS work depends upon our working relationships with districts, their leaders, and their cooperators.

No one believes that the problems of conservation districts are the same today as they were in 1937. A rural concept of soil conservation simply no longer is sufficient in a society that has become increasingly urban, a society in which the interests of the users of resources have become equal to those of the owners of resources.

Conservation today encompasses the full sweep of interrelated natural resources and their management and use. Emerging now is a special challenge to fit the activities and needs of man harmoniously into his total environment. The recognition of this crisis in the countryside has given birth to a new concept of creative conservation.

Environmental conservation

This concept of "full use" conservation says that as population grows and people live in greater and greater concentrations, we must consider the total environment.

Pure air, clean water, stable
(Continued on p. 151.)

Both our urban centers and small towns already are in trouble...

These cities will grow until they join together in seamless sprawls of steel and concrete canyons, shopping centers, and suburbs that stretch for hundreds of miles.

* * *

The Alternative

There is a better way to meet the needs of a growing population for living space...

We can use the countryside with all of its assets—space, beauty, outdoor recreation, moderate land and building costs, power, and underemployed people—as a site to expand industry and jobs.

We can use the countryside to meet the public demand for outdoor recreation, a demand which is expected to triple by the year 2000.

We can preserve in the countryside the maximum feasible number of family-type farms.

We can develop housing, community facilities, and jobs that will enable our towns, small cities, and open countryside—when joined in functional, multicounty Communities of Tomorrow areas
(Continued on p. 150.)

—to hold their young people and to provide living space for those Americans who would prefer to live, work, and play in, or close to, the great outdoors.

* * *

What Will They Be Like?

First, the Community of Tomorrow will cover a much larger geographic area than today's community. It may extend over several counties.

Second, the Community of Tomorrow will be natural in its geographic structure. Each of its components—villages, towns, cities, and counties—will be bound together by roads, rivers, and other physical and resource features that enable it to be a dynamic and fully functioning economic, social, and cultural unit. . . .

Third, the Community of Tomorrow will offer a wide range of industrial jobs as well as a full range of employment in business, research, professional, and trade services.

* * *

Bracing Up

To support the development of Communities of Tomorrow, the Department of Agriculture has established policies and methods to conduct programs in 12 supporting areas:

1. Planning

Sound multicounty planning is basic to the Communities of Tomorrow.

The development plan must be comprehensive. It must describe the area, its resources, its problems, its opportunities, the development objectives, the proposed projects to improve the area's economy and its social and cultural facilities and services, and the interrelationship between the various projects. It must take into consideration the needs of both skilled and unskilled people. . . .

* * *

We intend to help people build those communities. Our objective is to remove the scars of collision between man and his environment and to avert further collisions that will occur if we continue our present course.

I believe the American people will decide that the Communities of Tomorrow are worth the money, effort, and work their building will require.

ORVILLE L. FREEMAN

2. Farming and Ranching

In the Communities of Tomorrow a wide variety of farms will be needed.

With adequate income, commercial family farms and ranches will produce the bulk of the food and fiber. . . .

Conservation and proper use must be made of all of the soil, water, forest, grassland, and wildlife resources on our farms.

* * *

3. Business and Industry

The major reason for the present rural/urban imbalance of people and opportunity is the relative availability of jobs in metropolitan centers—and the lack of jobs in smaller cities, towns, and the countryside.

Jobs can be created by expanding industry, business, and agriculture; by developing health, education, and recreation facilities; by building new homes and community facilities; and by providing all the services demanded by a prosperous, progressive society. . . .

The town, small city, and open countryside that will become Communities of Tomorrow already have much to offer businessmen: Plant sites that cost less to buy, less to build on; space for plant expansions; space to park; a stable and willing work force;

and an opportunity to live within easy commuting distance of job and outdoor recreation areas.

* * *

8. Outdoor Recreation and Natural Beauty

Americans spend \$20 billion a year for outdoor recreation. By 1980, this expenditure is expected to be about \$47 billion. By 1980, this recreation boom should create 200,000 new full-time jobs in small cities and open countryside. These jobs will range from directing ski resorts, shooting preserves, and golf courses to providing support services, such as lodging, food, service stations, and bait and tackle shops.

Coupled with this effort to expand outdoor recreation is a drive to beautify the countryside, to make its cities, towns, and open spaces more attractive and inviting. Natural beauty is more than a rich source of pleasure. It shapes our values, molds our attitudes, and feeds the spirit.

9. Natural Resource Conservation and Development

By the year 2000, the land and water resources we use today will have to provide:

—Double the food output.

—Double the water for municipal use; quadruple the amount for manufacturing use.

—Double the land for homes, schools, factories, and other urban uses.

—Double the production of wood products.

—Fifty percent more irrigation water.

Creative conservation policies and programs can meet this need while upgrading the quality of the environment and strengthening the economy and standard of living in Communities of Tomorrow. ♦

soils, productive grasslands and forests, abundant wildlife, natural beauty, and the opportunity for man to live in harmony with his natural environment are essential. They are interrelated and mutually supporting objectives.

The key to the new approach is:

(1) Involving more people in resource work.

(2) Extending district services to additional people.

(3) Placing more emphasis on broad-based resource planning.

(4) At the same time continuing the original purpose of the district as an effective local action organization to get as much total conservation on the land as fast as possible.

District leadership

There is urgent need for strong leadership in conservation districts, in farm organizations and rural community chambers of commerce, among conservationists, tradesmen, bankers, and newsmen, to identify the array of new issues now facing the countryside and to devise constructive programs for dealing with them.

We know that an expanding national economy cannot long endure on a declining resource base. A rising standard of living cannot be sustained in a deteriorating environment. Fulfilling the needs of millions of people yet unborn cannot be assured unless we achieve full use of natural resources and planned patterns of land use without delay. The fruits of an expanding technology cannot be enjoyed unless technology itself is harnessed to meet the goals of the new conservation. This is the challenge leaders at all levels must meet.

There is need (1) to reidentify the resource assets of each community, county, and conservation district, (2) to project the probable demands that will be made

on these resources, and (3) to guide the development and use of these same resources along wise and orderly lines.

Conservation still begins on the land, on each individual acre. As a Nation, we have developed our resource conservation policies on the firm basis of essential involvement at the local level, for we are a people wedded to the concept of individual initiative and grassroots participation in the public affairs that concern us.

But we must understand, too, that our State and Federal governments also represent the interests of the individual and the local community. And we have wisely and properly drawn upon State and Federal resources to support the local effort. We have done this in the national interest because the summation of local interest is national interest. That is how we have advanced for three decades in the conservation and development of the Nation's lands and waters.

We must do much more to satisfy the needs of a dynamic people. The demands come from the urban society that is now in the majority and that increasingly decides what programs we shall have (including conservation), and how much financial help they shall receive. And these people are looking at the picture from the standpoint of resource users. This is the new resource climate in which we exist.

Not only are there steeply increasing demands on resources, but the kinds of demands on re-

sources are changing. The quality of resources is becoming more important, and the location of resource problems is shifting.

It is apparent that resource matters are growing more complex. We face new problems of conflict and competition. A given resource may have to do double—or triple—duty. And somebody is going to have to make decisions—unpopular decisions in many cases—about the allocation of resources to any given use.

The conservation and resource development task of the future emphasizes necessary involvement of local citizens, local governmental leadership, and State Government as well as Federal responsibility.

SCS objectives

SCS objectives for the next 5 years have been stated as:

(1) Essential maintenance of our resources basic for agricultural production.

(2) Mapping, inventory, and use of soil and water resources for agricultural and nonagricultural purposes.

(3) Use of land and water resources for recreation, wildlife, and natural beauty.

(4) Development of rural communities to provide employment and living opportunity as an aid to the rural-urban balance. The Communities of Tomorrow hold the promise that we can solve the problems of both city and rural living with one vigorous stroke.

Our collective goal is based on the conviction that the Nation's future still lies in the Countryside, USA. That vast countryside can offer relief from the teeming cities and their congested suburbs and can provide ample land and water to serve agriculture and the expanding needs of commerce and industry, and at the same time provide the broad acres on which to build garden communities for tomorrow's generations. ♦



Arkansas conservation districts authorized to operate projects

By Sterlin Hurley

President, Arkansas Association of Soil and Water Conservation Districts, and member, Arkansas Soil and Water Conservation Commission, Little Rock, Ark.

A major revision of the Arkansas Soil Conservation District Law, approved by the Governor on March 20, 1965, brought conservation districts in Arkansas up to par with other legal entities authorized to assume local obligations for improvement projects within the State.

Soil conservation districts in Arkansas now may acquire the authority to carry out all activities eligible for assistance from the U. S. Department of Agriculture. This includes the assistance provided under the Soil Conservation Act (Public Law 46), the Watershed Protection and Flood Prevention Act (Public Law 566),

and various other authorities.

Districts now have authority to acquire property outside their boundaries when necessary. They can exercise the power of eminent domain to fulfill all purposes of the State law as amended, rather than drainage purposes only. The authority to borrow money and issue notes and to pledge district income and property as security has been broadened to permit districts to issue bonds and to pledge district income from special benefit taxes.

The law now authorizes the assessment, levy, and collection of taxes based on special benefits resulting from works of improve-

ment carried out under an improvement plan for an improvement project area within a district or districts.

The provision for improvement project areas within a soil conservation district, or districts, was a significant change in the district law. Under this provision, the legal entity can be the local soil and water conservation district, and the district supervisors may exercise the rights formerly vested only with the commissioners of special-purpose districts.

When an improvement project area covers more than one conservation district, the court will appoint a joint board from the boards of supervisors of the districts involved.

By arming our district supervisors with new authorities, the landowners have endorsed the board's record and its ability to deal with people on a fair and equitable basis. Our own district boards, because of their greater

Legislatures give districts broad powers and

In Nebraska, the 1967 legislative session caught the national mood for strengthening local and State components of land and water development by passing 18 bills and six resolutions—many of them on water-resource development.

This activity was stimulated in part by the Water Resources Planning Act of 1965 and the District Outlook Committee Report of the National Association of Soil and Water Conservation Districts.

The need for greater participation of local and State units of government in the soil and water conservation program in America grew out of several factors: (1) Conservation districts have inadequate authority to carry out assigned responsibilities; (2) some

Nebraska enlarges soil and water programs and increases funds

By Warren D. Fairchild

Executive secretary, State Soil and Water Conservation Commission, Lincoln, Nebr.

district officials are reluctant to fully assume assigned responsibilities; and (3) the original model legislation purposely established a weak soil conservation committee, commission, or board.

But the picture in Nebraska is changing rapidly. Members of the Nebraska Legislature, historically strong supporters of natural resource legislation, cast only two negative votes in passing 1967 bills. All were actively supported by the Nebraska Association of

Soil and Water Conservation Districts.

Much of this legislation was the result of 14 recommendations developed by a 1965 Interim Legislature Study Committee on water. All of these recommendations were drafted into laws and passed by the Nebraska Legislature.

The following were among the most important laws enacted in the 1967 session:

(1) Legislative Bill 147 author-

involvement, are facing up to their growing responsibilities in a changing world.

We in Arkansas have the distinction of being the first State to enact a basic soil conservation district law. That happened in March 1937. Thirty years later is not too soon to revise that basic legislation in keeping with the needs of today.

The Arkansas State Association did not back this legislation with the intent or desire to limit the sponsorship of watershed projects or resource conservation and development project measures to soil and water conservation districts. On the contrary, we have continued to encourage our communities to sponsor needed municipal and industrial water supplies; our counties and State agencies to sponsor recreation or fish and wildlife developments; and other appropriate groups to join in when they can help to serve the total needs in a project area.

We have found that the revised district law does give us a new legislative tool to advance soil and water conservation. It permits us to weigh all factors and decide which legal entity can best carry out project objectives. Sometimes, an existing improvement district or drainage district which has enjoyed good working relationships with the landowners may be the group to assume local responsibilities for the dams, ditches, or other structures.

Although the revised law is relatively new, our local soil conservation districts are authorized sponsors or have applied for sponsorship to guide both the land-treatment and structural phases in 14 improvement project areas. Eleven of these are Public Law 566 watershed projects, and three are Resource Conservation and Development Project measures.

Creation of an improvement project area within an existing

soil conservation district under the new State law follows democratic procedures for establishing special taxing areas. The landowners who will benefit petition the board of supervisors of the local soil and water conservation district to adopt a proposed plan of improvement. Landowners representing a majority in numbers, or assessed valuation, must sign the petition. The board of supervisors then determines that the petition has the required number of signers and that a need exists for the improvement project area.

After adopting the proposed plan, the board petitions the local chancery court for approval of the plan. The improvement project area is established by order of the chancery court following published notice of hearing and formal hearing by the court. This action authorizes the board to exercise its rights under the revised district law. ♦

new tools to achieve goals

ized watershed conservancy districts (subdistricts of soil and water conservation districts) to exercise the power of eminent domain for recreational development around watershed and flood-control projects. This adds to the power of eminent domain given the watershed districts in 1957 for protection and related water activities.

(2) Legislative Bill 148 assigned a representative of the Nebraska Soil and Water Conservation Commission to serve as a member of the State Water Pollution Control Council.

(3) Legislative Bill 149 added a member to the State commission who will specifically represent municipal and industrial water users.

The enabling law, passed in

1937, created a three-member State Soil Conservation Committee to organize soil conservation districts. Through the years the Nebraska Legislature has given additional responsibilities to the committee—now called the Nebraska Soil and Water Conservation Commission. These include: (a) Soil and water conservation, (b) watershed protection and flood prevention, (c) flood control, (d) flood-plain management, and (e) comprehensive water planning. The membership represents all major interests in the State.

(4) Legislative Bill 414 provided county-State financing to encourage soil and water conservation districts to employ staff personnel. Two districts, Sarpy and Douglas, have already taken

advantage of this bill and are the first in the State to employ managers.

(5) Legislative Bill 893 enacted a State flood-plain law to be administered by the State commission in cooperation with political subdivisions. This legislation implements the first recommendation of the State Water Plan which was drafted on flood-plain management.

(6) Legislative Bill 416 included all urban areas in Nebraska in soil and water conservation districts. Urban areas had been excluded from districts until now.

The inclusion of urban areas combines with a change made by the 1965 Legislature for the election of district supervisors to insure a greater rural-urban support

and involvement in local district programs.

Local supervisors are now elected on a nonpartisan ballot during the State's general election rather than by special elections. As many as 6,000 votes were cast for a supervisor in the 1966 general election.

The Legislature raised the 1967-69 biennium budget for the commission to \$3,142,663. Of this amount, \$300,000 is for direct assistance to districts, \$457,692 for watershed planning under the National Watershed Protection and Flood Prevention Act, \$270,610 for comprehensive water planning, and \$1,206,398 to assist local watershed sponsors in the procurement of land, easements, and rights-of-way.

The 1967 Legislature also enacted Legislative Resolution 44 which established another Interim Council Study on water. This committee counsels with the commission on developing a State Water Plan. Between now and the 1969 Session of Legislature the committee will study local government reorganization with regard to water and multipurpose projects.

The National Water Resources Planning Act in 1965 established comprehensive water planning and subsequent multipurpose projects as national policy. Many Nebraskans feel that multipurpose districts are the logical answer to sponsoring multipurpose projects.

The Nebraska Legislature recognizes that soil and water development holds the key to the future economic growth of our State.

With the combined efforts of the Legislature, the governor, the districts, and the local people, Nebraska is making a concerted effort to insure that local and State governments will have the necessary tools for full participation in various State and Federal water projects. ♦

Broad planning districts

Georgia sets up 17 commissions to assist local governments in multicounty areas

By Glenn E. Bennett

Executive director, Atlanta Region Metropolitan Planning Commission, Atlanta, Ga.

Area-wide planning, including resource conservation and development, is becoming a reality in Georgia with the establishment of multicounty planning and development commissions. Since 1959 all but 11 of the 159 counties have been organized into 17 planning districts.

Population shifts, burgeoning urban centers, and overburdened local governments are easy to see. The emergence of a myriad of problems crossing political boundaries gives new dimensions to the planning process, and we are becoming keenly aware of the interdependence of all localities within a geographic region.

We are finding that land development and regulation, transportation, traffic, air and water pollution, education, crime, and a great many subjects demanding attention from cities and counties can be dealt with on an area-wide basis. We see resource development as a regional responsibility.

The area planning commission is not a new layer of government; it is a service organization like the soil and water conservation district. It seeks to strengthen the ability of the local governments to make sensible planning decisions, and it aims to involve citizens in shaping their future. It widens the horizons of some, and it pricks the conscience of others. It hopes to educate everybody to the problems and prospects of today and tomorrow.

Area planning and development commissions carry on four basic types of activities: area-wide long-

range planning; regional research; resource development; and local planning assistance. Other miscellaneous jobs performed by the commissions relate to coordination of county and city operations.

Long-range planning.—Long-range physical planning is keyed to land use and transportation. An area commission must begin early to sketch out a generalized land use plan. This has been done, in too many cases, with insufficient information. Along with other essentials, mapping, study, and analysis of soil and water resources are required. An area planner must go from the general to the specific, from the broad stroke to the detail. He must relate all parts to the whole.

Along with a continuing analysis of total community resources should go the educational and intellectual process of formulating goals for the region and its various localities. Here is where citizens and property owners can define potentials. They should be able to understand and explain their objectives. Regional policy can be stated and adopted with respect to the use and conservation of natural resources; it can be spelled out for human resources as well.

Regional research.—A successful area commission needs a continuous regional research activity for gathering statistics on people, jobs, housing, investments, incomes, and many other factors affecting the economics and the sociology of a planning district. The results of good research are the

input for long-range planning. Without information on all aspects of life within a region, sound planning is impossible. Fact finding, then, is the first step in area planning.

Resource development.—Most of our commissions carry out resource development projects involving special studies of industry, agriculture, tourism, forests, minerals, recreation, water, and many other subjects relating to the region's potentials.

Our commissions also spend much effort on technical assistance to communities, giving help on such items as zoning ordinances, subdivision regulations, downtown revitalization, and redevelopment.

A few years ago our commission worked with the Upper Ocmulgee River Soil and Water Conservation District to sponsor the Gwinnett County RC&D Project, which is now in its implementation phase.

The Heart of Georgia Area Planning Commission has been involved in a similar relationship with the Ochopee River Soil and Water Conservation District at Soperton.

A tricounty RC&D Project in Wheeler, Montgomery, and Treutlen counties was authorized.

Local planning assistance.—Planning on a scale such as we have in Georgia is much younger than the natural resource conservation movement represented by soil conservation districts, yet the philosophy and guiding principles of both are similar. Area planning is the expression of the collective purpose of the people who live and work in a region.

A good comprehensive planning attempt for any community or region must consider the properties of soils. Land cannot be managed economically and safely without the kind of soil analysis and the knowledge of soil capabilities and limitations that we are getting from our cooperative efforts with

the Soil Conservation Service in Georgia.

Recently my commission entered into agreements with SCS and with certain soil conservation districts providing complete, free, and constant exchange of information among us. Similar agreements are now being developed between the other 17 area planning and development commissions, the 27 soil and water conservation districts, and SCS.

Conservation districts have readjusted their work priorities, and SCS has met with every area planning commission to prepare general soil maps and interpretative materials for all counties.

Conservation districts, SCS, and planning commissions have joined in comprehensive sewer and water planning for all counties in the State. Planning grants are provided by Farmers Home Administration under agreements that insure use of the best resource information available from the districts and SCS.

We have produced recently a publication on *Soils Interpretation for Regional Planning in Metropolitan Atlanta*, in cooperation with the Soil Conservation Service and the Atlanta and Upper Ocmulgee River soil and water conservation districts. Here basic data are made available to all who are concerned with development in our area.

Other resource information made available by SCS includes data on watersheds, hydrology, stabilization of critical areas, areas of flooding, and potentials for plant and wildlife management and for recreation. For example, SCS has recently made a preliminary geologic examination and soils study of a 3,500-acre potential recreation lake (Mud Swamp) in Lowndes County. This was in cooperation with the Alapaha Soil and Water Conservation District and the Coastal Plain Planning Commission.

The recent SCS publication, *Know the Soil You Build On*, has had wide distribution in Georgia and is the kind of information being prepared for every county in Georgia by SCS. Good judgment suggests that urban growth ought to first use the land that can be developed most economically, efficiently, and suitably. This is a basic objective of planning, and knowledge of the different kinds of soil in the area helps to show how it can be achieved.

The State, Federal, and local support of our area commissions is excellent. Generally, localities have put up \$0.25 per capita, and Georgia has contributed about a million dollars to the program. Presently the State can support commissions with maximum annual grants of \$50,000 each, if the districts raise sufficient local matching funds.

Federal grants have exceeded State and local shares in many programs, like those offered through Department of Housing and Urban Development and Economic Opportunity Act projects.

It appears that only now, after some sad experiences, are planners and developers awakening to the staggering losses which have resulted from ignorance of soil properties and the potential savings when accurate soils information is applied to planning and development.

It would seem logical that before too long, land use control legislation would require that soil maps and their interpretation be used as a basis for making decisions. We have mandatory review by health officers and engineers for land subdivisions in the more enlightened jurisdictions. Why not mandatory review by soil scientists and conservationists?

Planning begins and ends with the human needs of people: air, land, water, shelter, space, health, education, mobility, work, play—all the factors of life. ♦

Oasis in the Badlands

The road winds through the Nebraska Badlands where fossils of giant turtles and other ancient creatures are exposed. It is hard to believe this dry, powdery land was once the bottom of a sea.

Then the road becomes a trail, slicing its way across slopes clothed with native grasses of the Plains.

Suddenly it falls over the rim of a canyon right into Albert Meng's garage. You'll know you're there by the green of the valley in violent contrast to the whiteness of the canyon walls. The word "oasis" seems to be appropriate.

Meng is chairman of the board of supervisors of the Sugar Loaf Soil and Water Conservation District in the very northwest corner of Nebraska. It was his work and

ingenuity, with the help of George McMillan, SCS soil conservationist assigned to the district, that turned this valley into an oasis.

The walls of the canyon not only add beauty and contrast, they are also useful. If and when it rains, they give up a lot of water—silt laden perhaps, but wet. And Meng makes use of nearly every



Albert Meng (left above) shows Soil Conservationist George McMillan the water-spreading levees that irrigate 300 acres of grass on his ranch. Haylands, ponds, and windbreaks lie like an oasis within the badlands (right). A rotation of wheat and fallow (below) makes efficient use of water on cropland.





drop of it before he lets it get away. "I use it until I wear it out," he says.

Diversion ditches tie into 15 diversion dams placed along the base of the canyon wall turning the water out into grassland. Soil conservationists call this water spreading. Yields of hay go up.

Until he started the water spreading he had been running about 75 head of cattle every year since he bought the place in 1931. Now his herd is up to 175.

Would you believe 300 acres of grass turned out 400 tons of hay the first cutting last summer? And

the second cutting is always better. Besides that, there is some green winter grazing on these fields until the snow flies.

But the real story of water spreading on Albert Meng's ranch begins on the slopes above the canyon rims. Up there he has 165 acres of cropland on which he grows 50 acres of wheat. It is all properly terraced, stripcropped, and protected with field windbreaks. Diversions here, too, help make the water behave. Steeper areas are covered with well-managed native grasses.

Some water does run these hur-

dles, however, and goes over the canyon walls. It is 100 percent runoff there because of the texture of the soil. And it picks up the Badlands silt.

A series of dams trap the water, letting some of the silt settle out. It never completely clears up until it freezes, which it does very readily in this area only 11 miles from South Dakota and 21 miles from Wyoming. The largest of his ponds, built several years ago with Agricultural Conservation Program cost-sharing, was 16 feet deep when built and is now 2 feet deep.

Level terraces catch the water as it comes from the diversions that feed away from the dams. The terraces become levees that carefully detain water from an inch to a foot deep all over the land between. Then it drops into the next interval and across the mixture of native wheatgrass overseeded with intermediate wheatgrass and alfalfa.

At the other end the "wornout" water again goes into ponds. "I figure all the water that falls on my place belongs to me, and I'm going to use it for my benefit," Meng said.

He estimates he has spent \$27,000 moving soil around on his place since he has owned it—building dams (4), diversions (4,000 feet), diversion dams (15), terraces (8 miles), water-control structures (33), and land preparation for water spreading (232 acres). Add to that 99 acres of range seeding, 1,057 acres of proper grazing use, a mile and a half of windbreaks, and 55 acres of pasture seeding, and you have most of the picture of his accomplishments.

It was his Great Plains Conservation Program contract that brought on the big push to completion. He entered the program in June 1959 and finished it at the end of 1964.

Then in his "spare time" he and Mrs. Meng are rockhounds. They roam the Badlands, bring in specimens, and cut and polish them. Their collection is interestingly displayed in the lovely living room of their air-conditioned ranch home next to Mrs. Meng's aquariums of tropical fish.

They also dig into, both literally and figuratively, the history of the area. Their collection of fossils is on another living room wall.

And this interest is shared by other groups. For the past several summers a college group from

California has been digging for fossils on the Meng land. Recently they discovered a specimen of titanotheriidae, a rhinoceros-like animal. When he isn't too busy, Meng goes along with them to share the discoveries.

"But I can't make a living in paleontology," he says. Yet you can't help feeling that here is a man who has his ranching operation so well organized it leaves him reasonable time to search for fossils and rocks. ♦

Revised Virginia law permits districts to get town vote

By E. L. Felton

Chairman, State Soil and Water Conservation Commission, Holland, Va.

Supervisors running for election in Virginia find they have to sharpen their wits to answer many new questions since conservation districts started going to town on election day.

Permissive legislation, passed by the 1964 General Assembly, allows voters in incorporated towns and cities to be included in soil and water conservation districts. Voters in these towns and cities can now join with those in rural areas in electing supervisors in general elections.

Previously, the three elected officials of the five-member boards were elected only by voters in rural areas.

When conservation districts were first organized, the task of controlling the erosion of soil and waste of water was thought to be exclusively a farm problem. And indeed, in the main, it was at that time.

A broader function

Today, however, we are concerned with the total environment. Farmland, while still of the utmost importance, is only part of the environment. There are conservation problems of grave proportions in suburban areas and urban areas as well.

Earth is being torn up at a bewildering rate. The land surface is uncovered for long periods while houses, office buildings, and

factories are built by the thousands. As a result, the soil in suburban areas is being washed away in tremendous volumes.

The eroded soil sloshes into our streams. It pollutes the water. It destroys fish life. It makes swimming uninviting if not an actual hazard to health.

The urban soil, washed from building sites, reduces the capacity of lakes, ponds, and reservoirs, or fills them completely. Thus it makes boating less enjoyable if it doesn't put an end to the sport altogether.

Concern over the total environment extends beyond the suburban and urban conservation problem and, indeed, the farm conservation problem. We recognize now that all renewable natural resources are interrelated. In the same way, the rural, suburban, urban, and metropolitan conservation problems are interrelated. We can't handle them in piecemeal fashion.

Soil and water conservation districts, with their experience in unifying help from many diverse sources, are uniquely qualified to represent citizens of varying interests.

A greater awareness

The selection of conservation district supervisors or directors in a general election drives home to the people that they are all part of the

conservation movement. Citizens thereby are better equipped to take an active and intelligent part in the conservation and development of all natural resources according to a comprehensive plan.

A general election also removes the criticism that members of the district governing body are chosen by a special segment of the population and gives the elected officials greater status than when chosen by a limited balloting. Local sources in Virginia report that a general election brings out 30 to 70 percent more voters than a special election.

We've found in Virginia that after a general election people remain curious for some time about functions of a conservation district. This gives our supervisors, SCS employees, and members of other cooperating agencies a chance to explain district services to the public.

We have found, too, that a general election sharpens the candidates for district posts. If the candidates are not already familiar with the conservation movement and the district program, they prepare themselves so that they will be able to answer questions asked by the people.

An all inclusive general election puts the board of supervisors in a much better position to carry out its full responsibilities. In the American tradition, it's the democratic way of expressing the public's concern and choice. ♦

Study of vegetable farms

In a study of vegetable farms by Economic Research, USDA, in the Imperial Valley of California, farms of less than 640 acres were found to be nearly as efficient as larger sizes. Among field-crop farms in this area, economies of size were found to occur up to about 1,500 to 2,000 acres. Custom hiring was found to be very advantageous to smaller farms.

Meetings . . .

NACD convention to discuss district and water needs

Watershed progress, needed improvements in water quality, State legislation to upgrade conservation district enabling acts, and district manpower needs—these are among the subjects to be discussed by officials of the Nation's 3,005 soil and water conservation districts at their 22d annual convention February 4-8, in Dallas, Tex.

The conference, sponsored by the National Association of Soil and Water Conservation Districts, is expected to attract 2,000 of the Nation's top conservation and resource development leaders.

W. R. "Bob" Poage, chairman of the House Agriculture Committee, will be the featured speaker at the NACD luncheon. Mrs. Charles C. Dean, president of the National Council of State Garden Clubs, will speak on "Conservation—the Foundation for America's Natural Beauty."

Addressing the annual NACD banquet will be Lt. Gen. W. F. Cassidy, chief of engineers of the U. S. Army Corps of Engineers. His subject is "Meeting America's Oncoming Water Needs—An Appraisal of Progress."

Immediately following the convention, many delegates will participate in a special series of tours to Mexico City and other cities in Mexico.

Dates and places

February 4-8, National Association of Soil and Water Conservation Districts, Dallas, Tex.

11-16, American Road Builders Association, Las Vegas, Nev.

11-16, American Society of Range Management, Albuquerque, N. Mex.

17-21, American Association of School Administrators, Atlantic City, N. J.

21-23, American Pulpwood Association, New York, N. Y.

22-24, Land Improvement Contractors of America, Sioux Falls, Iowa

25-28, Sprinkler Irrigation Association, Open Technical Conference, Denver, Colo.

March

8-10, National Wildlife Federation, Houston, Tex.

10-12, National Research Council, Washington, D. C.

10-13, The Wildlife Society, Houston, Tex.

10-14, Association for Supervision and Curriculum Development, Atlantic City, N. J.

11-13, North American Wildlife and Natural Resources Conference, Houston, Tex.

12-16, American Camping Association, Boston, Mass.

25-28, Associated General Contractors, Dallas, Tex.

29-30, National Conference on Rural Health, Seattle, Wash.

29-Apr. 2, American Science Teachers Association, Washington, D. C.

29-Apr. 2, National Farmers Union, St. Paul, Minn. ♦

Texas soil and suburbia meeting

"As our Texas population doubles in the next 33 years, 80 percent of the growth will be in the fringe area where the city meets the country," a nationally known city planner told the Soil, Water, and Suburbia Conference in Austin, October 25.

Robert L. Wegner, director of Regional Planning, North Central Texas Regional Planning Commission, Arlington, keynoted the 2-day meeting sponsored by the U. S. Departments of Agriculture and of Housing and Urban Development. It was the first of the statewide and regional meetings growing out of the national Conference on Soil, Water, and Suburbia held in Washington last June and was attended by more than 200 public officials, planners, engineers, conservationists, and developers. They discussed ways to solve soil and water problems of land in transition from rural to suburban uses. ♦

The Soil Conservation Service intensified its efforts in rural community planning and economic and social betterment in fiscal year 1967.

The evolving emphasis on the quality of rural life does not reflect any less concern for the physical conservation of land, water, and related resources. It rather recognizes that the value of those resources lies in their service in satisfying human wants; that the physical environment is the support and the setting for human life.

The Department of Agriculture in June 1967 summarized its philosophy of resource conservation and related goals and policies in a publication entitled *Resources in Action: Agriculture/2000*. It set forth seven major objectives of the conservation effort:

- Upgrading the quality of the environment.
- Strengthening the economy and standards of living in rural America.
- Helping to find solutions to America's water problems.
- Obtaining greater benefits from our forest lands.
- Providing creative opportunities for outdoor recreation.
- Widening public awareness and involvement in resource conservation.
- Helping other nations solve their resource problems.

The activities of the Soil Conservation Service during the year were directed toward achieving those objectives.

Community planning

Both the physical environment and associated economic and social conditions receive joint attention in communitywide planning for resource conservation and development. The Soil Conservation Service was involved in such rural community planning in fiscal 1967 to an extent unmatched

in previous years. Special effort was put into training all SCS people in the concepts and methods of community planning.

The Soil Conservation Service increased consultive services to local officials and planning units and to suburban landowners. It provided more than $\frac{1}{8}$ million services to 72,000 recipients, a gain over the previous year of 12 percent in services rendered and 20 percent in groups and individuals assisted.

Basic data for use in comprehensive plans was provided on 99,194,159 acres, almost five times the 21,041,551 acres covered in 1966. The information was provided for 1,475 plans, an increase of 60 percent over the number in 1966.

The demand for soil surveys and their interpretation increased again in 1967 in areas of rapid industrial and housing development in rural areas.

Local planning groups and State agencies in 27 States developed cost-share agreements amounting to more than \$700,000 to help provide the needed soil surveys for land use planning and guidance in construction. It is estimated that 3 $\frac{1}{2}$ million acres were mapped in areas that include rapid industrial and housing development.

While continuing to use SCS technical assistance for individual cooperators, soil and water conservation districts are responding to public demand to meet the changing character of land use and conservation problems by giving increased attention to community resource planning and development. More than 2,500 of the 3,010 districts now assisted by SCS have entered into new working agreements with the Department of Agriculture to cover broadened, long-range programs.

A responsible representative of the Soil Conservation Service is either chairman or cochairman of

Annual summary of activities of the Soil Conservation Service

Technical Action Panels in 50 States and some 3,000 counties. These panels, composed of representatives of all USDA agencies operating in each locality, have the responsibility for the "out-reach" function of the Department which seeks to bring the services of non-USDA agencies as well as their own to rural America.

Strengthening the rural economy

SCS is placing greater emphasis on the ways resource conservation can be used to alleviate poverty and substandard living conditions and to give more effective assistance to low-income rural families. In 1967 it added special staff assistance for this purpose in South Carolina, Arkansas, North Carolina, Maine, Kentucky, Alabama, and Tennessee.

Discussions of techniques of working with low income rural families were held with more than 20 State Technical Action Panels. Meetings were held with numerous community action agencies informing them of how conservation districts locate and assist low-income rural families.

More than half of the 817 watershed projects authorized for construction at the end of fiscal 1967 were in States where the average gross farm income was below \$3,500. About 52 percent of the 2 million conservation district cooperators were in these low-income States.

In the 17 States having the greatest number of nonwhite landowners, 29 percent of the nonwhite and 52 percent of the white land-

Resources in action 1967

owners were district cooperators. In these States, the number of Negro cooperators has increased at the rate of 5 percent during the past 2 years, compared to a rate of 2 percent for white cooperators

RC&D projects

Substantial progress was made in Resource Conservation and Development projects in 1967. At the end of the fiscal year, 21 projects were in operation with five others moving rapidly toward that stage. Job opportunities are being created through some 1,900 project measures now in action in operating project areas.

The first 20 operational projects will provide more than 11,000 man-years of employment during the period of construction and are expected to provide continued employment of nearly 12,000 man-years annually.

These land, water, and related developments have contributed to national economic growth by increasing output of goods and services an estimated \$65 million annually. The capital investments of these project measures are estimated to have been about \$22 million. The majority of the expenditures were from non-Federal funds.

The Great Plains Conservation Program

After 10 years of operation, the Great Plains Conservation Program is producing benefits far beyond the boundaries of individual participating farms and ranches.

In the extremely dry early

spring months of 1967, when some areas in the Plains States experienced serious wind erosion, dust-storms were significantly reduced in areas where upwards of 25 to 40 percent of the agricultural land was under Great Plains Program contracts.

The program has also made an important contribution in helping to stabilize farm and ranch income over a period of years. More and more cropland not suited to cultivation is being converted to permanent grassland and is now supporting livestock enterprises. Approximately 138,000 acres of cropland was converted to grassland in 1967. The total planned conversions now amount to 1,678,986 acres or 22 percent of the total cropland covered by Great Plains contracts.

Ten eligible counties were added to the list designated to participate in the program in fiscal 1967, bringing the number of authorized counties to 412. During the year, 4,069 new contracts covering 5,795,204 acres were signed, bringing the total participation to 27,872 contractors operating 51,185,968 acres.

Upgrading the environment

The traditional mission of the Soil Conservation Service—to bring about effective control of erosion and runoff and reduce damages from sedimentation and flooding throughout the Nation—is recognized in the Department's policy statement, *Resources in Action*, as the principal means of attaining its first conservation ob-

jective, "To upgrade the quality of the environment."

Activities in soil and water conservation districts, small watershed projects, and in several specialized programs made substantial progress in 1967 in the application of conservation measures to the land with SCS technical assistance.

Soil conservation districts

More than 95 percent of the Nation's land "in farms" and nearly two-thirds of the total land area are now within 3,010 local, self-governed conservation districts. By the close of fiscal year 1967, cooperators with these districts numbered 2,121,248 and owned or operated 708,149,403 acres on which they are planning and applying soil and water conservation plans with the assistance of the Soil Conservation Service. This brings nearly 46 percent of the operating units and more than 50 percent of the acreage in districts into scientifically planned programs of conservation.

During the year, SCS helped 1,169,317 land owners and operators plan and apply conservation work. Land reaching a state of adequate treatment increased more than 47 million acres in 1967.

A total of 766,604 land owners and operators applied one or more practices in accordance with their conservation plans during the year.

Cropland.—The use of such cropland practices as contour farming, conservation cropping systems, crop residue use, and minimum tillage increased on the order of 5 to 10 percent, although stripcropping and terracing declined slightly from the previous year. The number of farmers using minimum tillage in growing row crops is gaining rapidly.

A wind-erosion equation was developed and put in use as an aid in planning conservation measures in the vegetable-growing areas of the Northeast and Southeast.

Summary of Progress, Fiscal Year 1967

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Progress items	Total reportable progress	Cumulative to June 30, 1967	Progress items	Fiscal year 1967	Cumulative to June 30, 1967
Individual Conservation Plans and Related Services			Great Plains Conservation Program—Continued		
District cooperatorsNo.	108,612	2,121,248	Contracts signedNo.	4,069	27,872
District cooperatorsacres	41,866,542	708,149,403	Contracts signedacres	5,795,204	51,185,968
Cooperators canceledNo.	59,796	—	Contract modificationsNo.	16,826	98,987
Cooperators canceledacres	19,640,170	—	Contracts terminated:		
Landowners assistedNo.	1,169,317	—	By mutual consentNo.	135	636
Services providedNo.	3,351,850	—	By mutual consentacres	201,963	1,145,542
Owners applying practices .No.	766,604	—	For causeNo.	86	572
Special mapping for conser-			For causeacres	56,413	475,000
vation planning and CNI.acres	756,202	230,705,822	By expirationNo.	2,382	8,264
Basic plans prepared:			By expirationacres	3,680,391	12,811,276
FarmNo.	84,232	1,563,023	(Total terminations, No.)	(2,603)	(9,472)
RanchNo.	3,587	62,404	(Total terminations, acres)	(3,938,767)	(14,431,818)
OtherNo.	5,096	31,592	Cropland before GP contract,		
(Total basic plans)	(92,915)	(1,657,019)	acres	1,020,617	7,895,666
Farmacres	18,553,365	327,391,489	Planned cropland conversion,		
Ranchacres	15,002,206	202,648,457	acres	201,119	1,678,986
Otheracres	506,569	4,900,002			
(Total basic plans, acres)	(34,062,140)	(534,939,948)			
Basic plans canceled:			Servicing Other USDA Programs		
FarmNo.	42,352	—	Referrals serviced:		
RanchNo.	1,689	—	ACP—F.Y. 1967No.	331,427	—
OtherNo.	496	—	ACP—Program Yr. 1966 . .No.	—	321,543
(Total plans canceled)	(44,537)	—	Cropland Adjustment Pro-		
Farmacres	8,666,959	—	gramNo.	363	—
Ranchacres	5,526,891	—	Cropland Conversion Pro-		
Otheracres	33,148	—	gramNo.	124	—
(Total plans canceled, acres)	(14,226,998)	—	Appalachian Land Stabiliza-		
Basic plans revised:			tion and Conservation Pro-		
FarmNo.	35,813	—	gramNo.	1,223	—
RanchNo.	2,615	—	Conservation plans ap-		
OtherNo.	165	—	provedNo.	1,878	—
(Total plans revised)	(38,593)	—			
Farmacres	10,238,423	—	Soil Surveys		
Ranchacres	11,651,179	—	Soil surveys:		
Otheracres	63,583	—	High intensityacres	1,982,501	30,111,729
(Total plans revised, acres)	(21,953,185)	—	Medium intensityacres	37,383,259	542,538,168
Federal lands in coordinated			Low intensityacres	8,560,639	95,546,593
ranch plansNo.	93	460	Reconnaissanceacres	2,799,565	16,926,654
Federal lands in coordinated			(Total mapping)	(50,725,964)	(685,123,144)
ranch plansacres	1,807,528	5,187,567	Soil conservation surveys . .acres	—	34,056,150
			Soil conservation surveys		
			canceled or converted . .acres	13,159,318	—
Consultive Services					
Services providedNo.	126,289	—	Snow Surveys and Water-Supply Forecasting		
RecipientsNo.	71,965	—	Snow-course measurements .No.	5,649	—
Basic data for use in compre-			Aerial snow marker read-		
hensive plansNo.	1,475	—	ingsNo.	907	—
Basic data for use in compre-			Mountain precipitation gage		
hensive plansacres	99,194,159	—	readingsNo.	1,501	—
Land uses established by			Soil moisture readings . . .No.	1,425	—
local governmentNo.	41	—	River stations for which nu-		
Land uses established by			merical forecasts issued . .No.	450	—
local governmentacres	1,732,133	—	Numerical forecasts issued .No.	2,440	—
Properties treatedNo.	2,827	—			
Properties treatedacres	128,550	—	Recreation Developments		
Operating Units			Land owners and operators		
Total operating unitsNo.	5,276	4,632,011	establishing first commer-		
Total operating unitsacres	8,927,146	1,374,882,299	cial recreation enterprise .No.	3,802	42,759
Other unitsNo.	2,022	1,216,899	Land owners and operators		
			expanding commercial		
Group Conservation Plans and Services			recreation enterprises . . .No.	946	—
Group investigationsNo.	3,815	41,374	Land owners and operators		
Group investigationsacres	3,695,407	35,036,228	with recreation as pri-		
Group plans preparedNo.	3,256	40,085	mary source of income . .No.	307	7,688
Group plans preparedacres	1,651,734	28,078,465	Land owners and operators		
Land owners or users in			with recreation as pri-		
groupsNo.	19,090	286,626	mary source of income .acres	69,784	—
Services provided on jobs . .No.	59,771	—	Private noncommercial		
			facilities established		
Great Plains Conservation Program			or expandedNo.	34,232	375,229
Applications receivedNo.	4,809	32,521	Public recreation facilities		
Applications receivedacres	7,527,868	62,600,466	established or expanded . .No.	1,350	29,527

Summary of Progress, Fiscal Year 1967—Continued

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Fiscal year 1967	On the land June 30, 1967	Practices	Fiscal year 1967	On the land June 30, 1967
Conservation Practices Applied			Conservation Practices Applied—Continued		
Bedding	40,922	503,045	Mulch planting	28,155	164,911
Brush control	3,873,654	34,654,182	Woodland natural seeding	94,709	3,156,050
Irrigation canal or lateral	410	40,984	Obstruction removal	41,068	739,328
Cattle walkway	8	260	Pasture and hayland		
Chiseling and subsoiling	713,362	4,128,987	renovation	1,466,779	22,327,278
Clearing and snagging	673	3,284	Pasture and hayland		
Conservation cropping			planting	2,187,531	46,309,582
system	23,567,663	165,471,803	Pasture and hayland man-		
Contour farming	4,329,378	43,913,106	agement	10,033,282	36,841,574
Contour furrowing	48,595	811,248	Pipeline	2,146	18,674
Contouring orchard, etc.	19,756	201,304	Pitting	63,559	229,960
Controlled burning	362,602	3,401,004	Plow planting	87,764	1,584,413
Cover and green manure			Pond sealing or lining	859	10,550
crop	3,663,435	27,928,520	Range proper use	71,028,927	189,348,245
Critical area planting	94,518	1,704,443	Woodland proper grazing	1,789,706	10,849,732
Crop residue use	18,031,952	119,516,641	Pumped well drain	1	163
Cutback border	80	1,684	Pumping plant for water		
Dam, diversion	929	21,466	control	2,135	49,387
Dam, multiple-purpose	338	4,352	Range renovation	7,522	1,407,166
Debris basin	2,318	89,807	Range seeding on converted		
Range deferred grazing	14,358,078	51,210,265	land	171,539	4,890,696
Desilting area	315	3,909	Range seeding	442,373	9,289,534
Dikes and levees	284	9,496	(total range seeding, acres)	(613,912)	(14,180,230)
Irrigation ditch and canal			Irrigation pit or regulating		
lining	1,526	21,973	reservoir	1,818	42,158
Ditchbank seeding	963	21,393	Regulating water in drainage		
Diversions	3,202	92,551	systems	14,023	432,339
Dune stabilization	1,724	104,792	Rock barrier	25,283	278,274
Emergency tillage	232,321	3,576,919	Range rotation—deferred		
Farm pond	58,846	1,562,481	grazing	2,252,533	11,051,975
Farmstead and feedlot			Row arrangement	690,003	2,519,912
windbreak	29,325	626,001	Recreation access road	594	6,774
Field border planting	1,515	41,438	Recreation area		
Irrigation field ditch	2,710	126,668	stabilization	2,715	81,706
Field windbreak	3,613	82,712	Recreation area planting	27,660	184,792
Firebreak	8,445	128,919	Recreation area pruning and		
Fish and crop rotation	2,705	12,262	thinning	5,609	55,484
Fishpond stocking	44,167	845,646	Recreation land grading and		
Fishpond management	30,782	187,051	shaping	10,614	108,569
Floodwater diversion	27,780	1,251,641	Recreation trail and		
Floodwater-retarding			walkway	280	2,933
structure	652	9,118	Spoilbank spreading	4,833	128,294
Floodway	40	532	Spring development	5,498	95,498
Grade stabilization			Stock trail	168	3,200
structure	13,774	195,784	Streambank protection	504	5,556
Grasses and legumes in			Stream channel		
rotation	1,496,326	22,682,025	improvement	986	12,239
Grassed waterway or			Stream channel		
outlet	86,687	1,638,983	stabilization	24	613
Hedgerow planting	307	29,033	Stripcropping, contour	173,950	5,536,725
Hillside ditch	249	5,960	Stripcropping, field	67,818	1,489,615
Irrigation pipelines	4,340	55,555	Stripcropping, wind	313,298	13,967,371
Irrigation storage reservoir	1,235	40,429	(Total stripcropping, acres)	(555,066)	(20,993,711)
Irrigation system, sprinkler	4,446	101,166	Structure for water control	86,558	1,515,027
Irrigation system, surface and			Stubble mulching	4,049,206	19,004,960
subsurface	4,651	114,934	Drainage field ditch	5,745	158,192
Irrigation system, tailwater			Terrace, basin	77	2,503
recovery	816	7,822	Terrace, gradient	16,268	819,221
Irrigation water manage-			Terrace, level	12,365	373,936
ment	3,316,663	14,044,611	Terrace, parallel	7,943	50,471
Land clearing	669,696	13,078,154	(Total terraces, miles)	(36,653)	(1,246,131)
Drainage land grading	38,279	263,488	Tile drain	22,893	664,968
Irrigation land leveling	457,317	9,504,071	Tile system structure	9,783	163,964
Land smoothing	322,199	5,140,695	Toxic salt reduction	82,829	1,236,025
Livestock exclusion	914,566	23,723,949	Tree planting	294,786	13,113,619
Minimum tillage	1,404,065	10,716,222	Trough or tank	13,131	341,203
Drainage main or lateral	7,086	283,675	Vegetative barrier	371	6,822
Mole drain	153	45,346	Vertical drain	77	1,675
Mulching	28,144	463,522	Waterspreading	27,886	899,163

Summary of Progress, Fiscal Year 1967—Continued

Total reportable progress in soil and water conservation programs assisted by the Soil Conservation Service

Practices	Fiscal year 1967	On the land June 30, 1967	Practices	Fiscal year 1967	On the land June 30, 1967
Conservation Practices Applied—Continued			Conservation Practices Applied—Continued		
WellNo.	8,093	390,157	Woodland thinningacres	61,622	1,502,592
Wildlife habitat preservationacres	2,286,428	11,940,200	Woodland underplanting .acres	38,623	930,713
Wildlife wetland developmentacres	110,193	992,728	Woodland weedingacres	450,798	9,596,315
Wildlife habitat developmentacres	304,749	3,200,012	Land Treated		
Wildlife wetland preservationacres	273,119	2,735,154	Land adequately treated ..acres	47,313,733	368,858,342
Wildlife watering facility..No.	1,092	7,429	Land Use Conversions¹		
Woodland direct seeding .acres	44,178	539,945	Cropland to grasslandacres	1,553,019	15,713,456
Woodland harvest cutting .acres	917,665	15,951,961	Cropland to woodlandacres	126,155	1,822,933
Woodland intermediate cuttingacres	915,238	15,133,767	Cropland to wildlife -recreationacres	67,017	770,184
Woodland interplanting ..acres	27,999	879,396	Cropland to "other"acres	177,945	3,234,700
Woodland pruningacres	24,418	388,652	All other uses to cropland .acres	376,462	4,566,395
			All other uses (except cropland) to wildlife-recreation ...acres	367,412	4,057,621

¹ Conversions on the land June 30, 1967, are estimates of conversions since July 1, 1962.

Grazing land.—Significant conservation progress was made on the 650 million acres of privately controlled range and related grazing lands in fiscal 1967.

Range seeding increased 17 percent to nearly 614,000 acres, while pasture and hayland planting continued at about the same level, slightly above 2 million acres. Range proper use increased 6 percent to 71,028,927 acres.

Woodlands.—Conservation district cooperators continued to improve woodlands on private lands by using good conservation practices in existing woodlands and establishing new ones.

Tree planting increased 26 percent to 294,786 acres. In addition, 29,325 acres of farmstead and feedlot windbreaks and 3,613 miles of field windbreaks were planted. There was a marked increase in practices for managing existing woodlands.

New plant materials

Three recently established SCS plant materials centers, where new plants are tested and developed for erosion control and conservation uses, came into production during 1967. These centers are at Cape May, N. J., Quicksand,

Ky., and Knox City, Tex.

Four improved grass varieties were named and cooperatively released with State experiment stations. Work at the centers has been modified to give emphasis to developing plants for protective structures and waterline margins, plants for mined-land spoils, roadsides, recreation areas, and landscape beautification.

Public and private rangeland

Joint memorandums of agreement between the Soil Conservation Service and the Farmers Home Administration were developed in several States to guide personnel in assisting grazing associations. SCS rangers have assisted with about 150 FHA-financed grazing associations to date. One hundred coordinated plans were developed with the Bureau of Land Management and conservation district cooperators who use intermingled public and private land.

SCS and Forest Service range staffs studied needs and progress in the field for coordinating assistance to conservation district cooperators who use grazing allotments on National forests.

Natural beauty

Increased emphasis was given to esthetic and environmental qualities of the countryside in all resource planning and development work in which SCS provided assistance.

Practices and measures contributing to natural beauty, mostly, are parts of comprehensive soil and water conservation plans for farms and ranches, community parks and recreation areas, highways and roadsides, and disturbed land areas.

Technical assistance has been extended to an increasing number of districts which have undertaken reclamation of strip-mined lands and other disturbed areas.

Substantial progress has been made in incorporating natural beauty into the more than 800 small watershed projects now in operation. Since 1965 all recreation facility plans authorized for development on these projects have included specific attention to esthetic values.

Outdoor recreation opportunities

Outdoor recreation facilities continued to be established and expanded at an accelerated pace

in rural areas with Soil Conservation Service assistance during fiscal year 1967.

Land converted to wildlife and recreation was increased by 40 percent over the preceding year, amounting to 434,429 acres.

During 1967, a total of 3,802 land owners and operators established their first commercial recreation enterprise, and 946 expanded previously established enterprises. Landowners changing to recreation enterprises as a primary source of income totaled 307 on 69,784 acres. More than 34,000 private individuals and groups established or expanded recreational developments primarily for noncommercial use.

Through the application of conservation practices, land owners and operators in 1967 created new recreation opportunities amounting to an estimated 16½ million user-days. The total includes 4,272,000 hunter-days, 3,040,000 fisherman-days, and 9,208,000 other recreation user-days.

Some of the conservation practices established specifically for recreation were 2,715 acres of recreation area stabilization, 27,660 acres of recreation area planting, 5,609 acres of recreation area pruning and thinning, 10,614 acres of recreation area land grading and shaping, and 280 miles of recreation trails and walkways.

SCS assisted units of local government establish or expand 1,350 public recreation developments.

Small watershed projects also are contributing materially to meeting the growing need for public recreational opportunity. A total of 136 public recreation developments have been planned in projects approved for operations in 33 States. These developments will provide basic facilities for an estimated 7 million user-days annually by the public.

Development of a procedure for appraising potentials for outdoor

recreation was completed under SCS leadership in 1966. Appraisals of local potentials for outdoor recreation had been completed or were planned by the end of the year in more than 1,200 counties in 48 States and Puerto Rico.

Watershed projects.—Demand from local organizations for assistance in dealing with water problems and related land-resource development through the Watershed Protection and Flood Prevention Act continued to grow during 1967.

Local sponsors have initiated requests on about a third of the 8,300 potential projects indicated as needed by the National Inventory of Soil and Water Conservation Needs. A total of 151 new applications in fiscal 1967 brought the total to date to 2,653.

Authorizations for planning assistance were limited by Executive Order to 100 in 1967, as in the preceding year. Although a total of 1,311 watersheds had been authorized for planning at the end of the 1967 fiscal year, the backlog of unserved applications continues to mount and now totals 1,342, slightly more than 50 percent of the number received.

During the year, 88 watershed projects were approved for operations, bringing the total to 817 projects representing about 10 percent of the potential shown in the Conservation Needs Inventory. An additional 53 watershed work plans were completed and awaiting approval at the close of the fiscal year.

Forty-five projects were completed during the 1967 fiscal year, the highest number in any year since the program was started. One hundred and fifty-nine projects in 43 States now have all land treatment and structural measures completed.

Local interest in the development of multiple-purpose projects continue at a good rate. Sixty-

one of the 88 projects approved for operations in 1967 included two or more project purposes.

Appalachia.—Interest in watershed projects continues high in the Appalachian Region. Seventeen new watersheds were authorized for planning, and 16 others approved for installation of land treatment and structural measures. Total Federal cost of watershed projects in Appalachia is estimated to be \$136 million.

Flood-prevention projects.—In addition, work plans were prepared for seven subwatersheds covering about 210,000 acres in the 11 large river watersheds authorized for flood-prevention work. All planned works of improvement have been installed in 99 subwatersheds, and all structural measures are complete in an additional 51. Eighteen of these subwatersheds now feature multiple-purpose objectives.

River basin investigations.—During fiscal year 1967 the Department of Agriculture cooperated in 43 river basin surveys under the provisions of Section 6 of Public Law 566. Eight of these are framework studies to provide broad-scale analyses of water and related resource problems. Fifteen others include more intensive studies of specific projects which should be installed within 10 to 15 years.

In addition, 20 studies, including five new starts, are being made in cooperation with a State water-resource agency or another Federal agency. One report, that on the Poteau River Basin, completed in 1966, was published.

Water-management practices.—Cooperators with conservation districts completed 322,199 acres of land smoothing, 38,279 acres of drainage land grading, and 457,317 acres of irrigation land leveling in fiscal 1967. They also put improved irrigation water management into effect on about 31½ million acres, an increase of 18 per-

cent over the previous year.

Snow surveys.—Further advances in technology of snow surveys and water-supply forecasting improved the quality of data provided to water users. The continuing shift from manual to automatic telemetry procedure makes it possible to obtain current data from remote points instantaneously, thereby improving the quality and eliminating the need for personnel to visit the sites to make measurements.

Conservation Needs Inventory

The National Inventory of Soil and Water Conservation Needs, first completed in 1958, is being updated to reflect current conditions on the rural non-Federal land of the Nation.

Fieldwork was completed during 1967 to obtain data on land use and treatment needs from 130,000 sample areas in all States. The data are being placed on cards and tapes at two statistical laboratories.

Nineteen States completed fieldwork on the inventory of small watershed project needs and the data were key-punched in the Washington Data Processing Center.

Soil surveys

Detailed soil mapping was completed on 47,926,399 acres in the 1967 fiscal year, compared to 55,205,191 acres in 1966. Approximately 668 million acres, or about a third of the non-Federal rural land of the United States, is now covered by detailed soil surveys.

In addition 2.8 million acres of reconnaissance soil surveys were completed during the year. These were for general soil maps in Idaho and Oregon for the use of State public works agencies to develop data on the soils suitable for irrigation. The States shared the cost of these soil surveys.

The use of non-Federal funds for soil surveys continued to in-

crease. The 1967 soil survey plans of operations showed an estimated \$700,000 in funds, services, and facilities available from local groups and \$1,543,000 from State agencies. In addition \$545,000 was available from other Federal agencies.

Forty-three soil survey reports covering an area of 28,368 square miles were sent to the Government Printing Office during the fiscal year. Forty-seven surveys covering 32,608 square miles were published.

The SCS has developed a national system of evaluating soils to indicate suitability for woodland use and management. This system provides a similar interpretation of soils information for forest planning and management that the land-capability classification does for croplands.

Demands for guidance and for information about use of soil surveys for nonfarm uses, both within and outside the Service, continue to increase. With assistance from SCS engineers, a "Guide for Interpreting Engineering Uses of Soils" was completed and given limited field distribution.

Interest in use of general (small-scale) soil maps has increased, especially for resource area planning, including RC&D projects, river basin studies, and economic development regions.

SCS assisted in making new estimates of potentially arable soils in the world for the President's Science Advisory Committee on World Food Supply. The results are published in the report of the committee.

Widening public awareness

The Department's publication *Resources in Action—Agriculture/2000* has been distributed widely to people who influence use of natural resources. It is being used as a guide for efforts to gain wider understanding that

conservation is a physical task, a social philosophy, and an economic necessity.

A workshop on "Soil, Water, and Suburbia," sponsored jointly by the Department of Agriculture and the Department of Housing and Urban Affairs in June, served to call attention to the many non-farm uses of published soil surveys. It generated many information requests from interests engaged in zoning, planning, and building. *Know the Soil You Build On*, a new SCS publication, had its initial release at the conference.

Widespread distribution of a set of 16- by 20-inch color prints of conservation scenes from each State, Puerto Rico, and the Virgin Islands, entitled "America the Beautiful," helped to gain better appreciation of the Department's efforts for rural area development and countryside beautification.

Helping other nations

The Soil Conservation Service continued to work with the State Department's Agency for International Development and USDA's International Agricultural Development Service on overseas technical assistance programs. As of June 30, 1967, SCS was providing assistance in the following countries under Participating Agency Service Agreements with AID: Brazil, Ecuador, India, Nicaragua, Nigeria, Thailand, Tunisia, and Vietnam. SCS had a total of 30 employees working in eight countries at the year's end.

SCS also provided assistance to 509 visiting technicians from 62 countries. Four hundred and fifteen of these were sponsored by AID and spent approximately 233 man-months in training with SCS. Thirty-five were sponsored by the Food and Agriculture Organization of the United Nations and sent by their governments, sponsored by private foundations or organizations, or came on their own. ♦

From the Administrator:

Blueprint for a Rural-Urban Balance



A second policy statement in the Department of Agriculture's program for Agriculture/2000 is now being distributed nationwide.

The publication, *Communities of Tomorrow*, is a companion to the recently issued *Resources in Action* which sets forth USDA goals and policy in resource conservation and development. Both give authoritative guidelines to conservation leaders and citizens for the rejuvenation of rural America.

Communities of Tomorrow—Agriculture/2000 was prepared by a departmentwide task force under the leadership of Secretary of Agriculture Orville L. Freeman and Assistant Secretary John A. Baker. The document outlines in broad terms possible solutions to the growing imbalance of people and opportunity in our country. The answer is a new type of community, neither urban nor rural but possessing the highest values of both—a type of functional multi-county community that blends the economic and cultural opportunities of affluent metropolitan life with the space and beauty of the countryside.

As did *Resources in Action*, this new statement defines a major mission of USDA—that of “outreach” or rural areas development—and sets forth in broadest terms major policies and methods needed to brace up communities of tomorrow.

The role of technical action panels in this effort to help the Nation enjoy the benefits of a vigorous and healthy countryside is carefully spelled out.

The study blueprints 12 supporting areas to further the development of Communities of Tomorrow. They are: (1) Planning, (2) Farming and Ranching, (3) Business and Industry, (4) Community Facilities, (5) Elimination of Poverty, (6) Education and Job Training, (7) Housing, (8) Outdoor Recreation and Natural Beauty, (9) Natural Resource Conservation and Development, (10) Health and Welfare, (11) Food, and (12) Transportation.

Each of these 12 areas is then examined separately in a format that sets forth: (1) A background statement, and (2) a declaration of USDA policy designed to implement that particular support area.

For instance, of planning the report says, “Sound multicounty planning is basic to the Communities of Tomorrow. The development plan must be comprehensive. It must describe:

- the area
- its resources
- its problems
- its opportunities
- the objectives of development
- the projects proposed

to improve the area's economy and its social and cultural facilities and services, and

- their interrelationship.”

To permit such planning to be most effective, the document states that it should be coordinated with a consistent and purposeful national land use policy.

Twelve policy statements support goals for planning. Several call for SCS involvement, including:

- “—encouraging proper use of

land and water resources in comprehensive planning and in implementation of zoning and other land use improvement measures, and

- providing applicable technical and professional assistance and basic data as they relate to the use of soil, water, woodland, and other natural resources.”

The support statements on Farming and Ranching, Outdoor Recreation and Natural Beauty, and Natural Resource Conservation and Development outline major objectives toward which USDA conservation efforts will be vigorously directed.

The statement reiterates USDA policy to help landowners use and care for every acre in the national interest, to offer technical advice in the selection of proper building sites and prevention of erosion on construction, to aid in pollution control, and to help local leaders organize conservation districts—all familiar SCS functions.

Communities of Tomorrow reinforces the need to fully understand the earlier document, *Resources in Action*. Each in its own way contains a clear mandate for the Soil Conservation Service. As the Department's technical arm for planning and action in resource conservation and development, these writings provide us an updated conservation charter.

I expect this newest policy statement to be a useful study guide for governing boards of conservation districts, sponsors of watershed and resource conservation and development projects, and others with whom we work.

I also expect all SCS employees to give high priority to the reading and understanding of this document. Collectively we have made great progress in rural America, but the biggest steps in the revitalization of the countryside remain to be taken.

D. A. WILLIAMS



If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.



Communities of Tomorrow: Agriculture/2000. U. S. Department of Agriculture. 1967. 31 pp., illus.

The second in a series of concise documents redefining the Department of Agriculture's programs and policies, *Communities of Tomorrow* is concerned with the welfare of rural people in much the same way that *Resources in Action* considers problems of the physical environment.

After stating the problem of rural-urban imbalance and describing hopes for "communities of tomorrow" in which current ills can be corrected, the booklet enunciates USDA policies in 12 supporting areas.

By virtue of its high authority, this, like the first in the series, is a document with which every employee of the Department will need to be thoroughly familiar. (See also the Administrator's comments on page 167 and the article on page 149 of this issue of *Soil Conservation*).—B. O.

New publications

Outdoor Recreation Planning for the Handicapped. 1967. U. S. Dept. Int., Bur. Outdoor Recreation. 34 pp., illus. \$0.40. Various methods, dramatically illustrated, are recommended for adapting outdoor recreation facilities to the handicapped. Much of this can be accomplished by modifying existing facilities and programs. With a few modifications, playgrounds can be func-

tional and attractive for all children, and swimming, fishing, and boating facilities can be added or redesigned for use by everyone. Camping for the handicapped and self-guiding nature trails for the blind are other ways of making outdoor recreation available.

Handbook of Agricultural Charts 1967. USDA Agr. Hbk. 348. 151 pp. Reproductions of charts and tables prepared by the Economic Research Service, Statistical Reporting Service, Agricultural Research Service, and Foreign Agricultural Service that can be purchased as slides or black and white photographic prints.

New Careers in International Agriculture. 1967. USDA. Unnumbered.

A brief pocket-size booklet explaining the need and opportunity for careers in foreign agriculture and answering questions about employment overseas.

Timber. Rev. 1967. USDA PA-545, 16 pp. illus. \$0.20. Story of a timber sale on a National Forest.

Soil surveys

Scotland County, North Carolina. BY ROBERT E. HORTON. 1967. 70 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Robert E. Horton, John W. Turpin, Julian H. McIntyre, Ronald B. Stephens, Roy A. Goodwin, Jr., and Dean W. DaMoude.

Garfield County, Oklahoma. BY BILL SWAFFORD. 1967. 57 pp., illus.; maps 3.17 inches to the mile (1:20,000).

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



America The Beautiful—Pennsylvania

USDA SOIL CONSERVATION SERVICE
A WATERSHED PROTECTED, NORTHUMBERLAND COUNTY SOIL AND WATER CONSERVATION DISTRICT

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P. 192

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



WILDLIFE CONSERVATION AND HABITAT IMPROVEMENT
Reports on cooperative field activities

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A recreation lake on a ranch in the Iron County Soil Conservation District in Utah provides a suitable environment for fish and man.

Working together . . .

Our annual roundup of articles on wildlife conservation and habitat improvement is notable this year for the story it tells of interagency cooperation.

Eighteen different organizations (besides SCS, the local conservation district, and the landowner in each case) are participants in the seven field projects reported in this issue. Here is the list:

Public hunting area around Lake Cumberland, Ky. (p. 171)—U. S. Army Corps of Engineers, Kentucky Department of Fish and Wildlife Resources.

Little Contentnea Creek watershed, N. C. (p. 171)—North Carolina Wildlife Resources Commission, U. S. Fish and Wildlife Service.

Fish survival study at French Creek Pumping Station, Wash. (p. 173)—U. S. Bureau of Commercial Fisheries, U. S. Bureau of Sport Fisheries and Wildlife, Washington Department of Fisheries, Washington Department of Game.

Public shooting fields in Massachusetts (p. 175)—Massachusetts Division of Fisheries and Game.

New Hampshire Satellite Tracking Station (p. 176)—U. S. Air Force, U. S. Bureau of Sport Fisheries and Wildlife, New Hampshire Fish and Game Department, New Hampshire Cooperative Extension Service.

Attwater Prairie Chicken Refuge in Texas (p. 179)—World Wildlife Fund, U. S. Fish and Wildlife Service, Texas A&M University, Texas Parks and Wildlife Department, Cesar Kleberg Wildlife Foundation, King Ranch.

Glendale Game and Fish Area in Indiana (p. 180)—Indiana Department of Natural Resources.

Libby Brook water-temperature study in Maine (p. 178)—Maine Department of Inland Fisheries and Game.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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Farmers help improve lakeside hunting area, by William H. Casey
Wildlife gets a break in watershed project, by John P. Edwards
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By L. Dean Marriage and Richard N. Duncan
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By James F. Hayden
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By Clayton L. Heiney
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Conservation and land-management agencies are finding ways to work out their plans together so that wildlife has due consideration along with other resources in development projects. Here are two examples of multiple-agency planning that are paying off.

Coordination in wildlife conservation

Farmers help improve a lakeside hunting area

By William H. Casey
Biologist, SCS, Lexington, Ky.

Because four government agencies found a way to continue farming and use conservation practices to keep public land producing farm game, Kentucky has an outstanding public hunting area around Lake Cumberland, a reservoir constructed several years ago by the U. S. Army Corps of Engineers for flood control and power production.

Some 35,000 acres surrounding the permanent pool was acquired by the Corps to allow for water-level fluctuations. Much of this marginal land is flooded infrequently and some of it never. In 1963, the Corps entered into an agreement with the Kentucky Department of Fish and Wildlife Resources authorizing the State to develop and manage the area for public hunting.

A return to farming

Realizing that the natural growth of brush and trees on the former farmland would soon become too dense to support good numbers of quail, rabbits, and other wildlife, biologists of the Wildlife Department worked out an arrangement to return some of the land to farming.

To do this, the department sub-

leased the land to farmers who would grow the crops the biologists wanted and follow good conservation practices.

Each farmer became a cooperator with the Pulaski County Soil and Water Conservation District. The Soil Conservation Service provided technical help to prepare a conservation plan for each tract, including needed wildlife habitat improvement practices.

A primary objective of the plans is to establish a food and cover pattern of maximum value to wildlife while using the land within its capability and keeping the soils productive.

For example, the plans provide for leaving strips of brush and trees around crop fields so the game animals will have protective cover adjacent to their food sup-

(Continued to p. 172)

Wildlife gets a break in watershed project

By John P. Edwards
Biologist, SCS, Raleigh, N. C.

Joint planning for wildlife habitat preservation and development can assure consideration of fish and wildlife along with other natural resources in watershed-protection and flood-prevention programs.

Federal and State wildlife agencies have cooperated with the Soil Conservation Service in planning the Little Contentnea Creek Watershed Project in North Carolina to accomplish that objective.

After the sponsors' application for a project under Public Law 566 had been approved, SCS asked

A greentree reservoir, combining woods and water for wildlife habitat is flooded in the winter when trees will not be damaged.



the North Carolina Wildlife Resources Commission to join in the preliminary investigation to determine the possible effects of the project on the fish and wildlife resources of the watershed.

The swamps and bottom lands of Little Contentnea Creek had furnished water, fish, game, and timber to local residents since the area was settled. In recent years flooding had become increasingly serious. Hurricane damage left the creeks heavily silted and clogged with debris so that water movement is severely retarded. In the summer of 1962 as much as 40 percent of some crops was destroyed.

Detailed wildlife study

The Wildlife Commission reported that the watershed was of high value for fish and wildlife and that if a project were carried out damages would occur to these resources. Consequently, the Soil Conservation Service asked that biologists from the commission, the U. S. Fish and Wildlife Service, and SCS make a detailed investigation of the watershed. This group, with the assistance of a soil conservationist, hydrologist, and engineer, investigated all of the areas in the watershed that could be affected by project construction and made an assessment of the extent of damages.

The investigation revealed that the more valuable fish and wildlife habitat was located in the lower section of the watershed; that fish such as eastern chain pickerel, warmouth, redbfin, and largemouth bass were abundant; and that waterfowl and furbearers used the area extensively throughout the year since the stream and adjacent swamps provided valuable food and cover areas.

Following this joint study, the North Carolina Wildlife Resources Commission with the assistance of the Fish and Wildlife Service made a detailed fish and wildlife study of each stream and swamp

run. The report included a map showing the types of vegetation and their value to game animals and birds and suggested ways in which damage could be reduced or averted. This report proved to be of valuable assistance to the planning staff in later project formulation.

As work on the watershed plan progressed, it became evident that some damage to fish and wildlife habitat was unavoidable if the degree of flood protection requested by the sponsors was to be achieved. But with the knowledge that the more valuable wildlife habitat was in the lower section of the watershed, the planning staff was able to formulate the project so as to minimize damages in that area. It specified that in the lower 8 miles of the project, only a floodway would be cleared to facilitate water movement. By eliminating channel excavation the plan will preserve an 8-mile section of fishing stream.

The three cooperating agencies then worked out measures to alleviate other damages to fish and wildlife habitat that might occur as a result of the works of improvement. At a later meeting with local sponsors, the mitigation measures were accepted and requested by the sponsors to be included in the plan.

Greentree reservoirs

Among the mitigation measures included in the final work plan are two impoundments with a total surface area of 70 acres. The lakes will be stocked with game fish and will be open to public fishing.

For waterfowl, three "greentree type" impoundments covering a total of 270 acres will be constructed. A "greentree" reservoir is an area of hardwood bottom land or swamp that is enclosed by a low levee having water-control structures so the area can be flooded during the season when waterfowl use it, from October to March. During the spring, summer, and

early fall, the water is removed so the trees within the levee will not die.

The watershed work plan for Little Contentnea Creek has been completed and approved by Congress. Construction probably will begin in 1969.

Several other watersheds in eastern North Carolina and throughout the country have been planned using this same "team" approach. In North Carolina, the Chicod Creek watershed plan includes two greentree impoundments and one fishing lake and the Hobbsville-Sunbury watershed plan includes a large greentree impoundment. ♦

Hunting area

(Continued from p. 171)

ply. They also provide for keeping some crop fields out of production in certain years to permit wild food and cover plants to grow and for mowing the vegetation on these fields in strips to make the area more usable by game and more accessible to hunters.

Deer, quail, and rabbits

Not all the planned work has been done, but good progress is being made and the results to date are extremely satisfying. It is estimated that about 90 percent of the deer harvested in Pulaski County in 1966 was taken in this area. Quail hunting success has been better than the average for the State and rabbit hunting at least equal to the average. Mourning doves are using the area in increasing numbers.

This arrangement for providing good hunting on public land is enthusiastically endorsed by all the agencies concerned. So pleased is the Kentucky Department of Fish and Wildlife Resources that it plans to make similar arrangements for management of the lands around Nolin, Barren, Green River, Rough River, Cave Run, Buckham, Grayson Reservoirs, and others.

Arnold Mitchell, director of the Department's Division of Game Management, says "While the problem of finding a place to hunt is not so acute in Kentucky as in some other States, still many hunters rely heavily on public lands. We think the number of such hunters will increase in the years ahead and are trying to prepare for that increase."

For multiple benefits

Commenting in a similar vein, Col. J. L. Fishback, district engineer for the Army Corps of Engineers at Nashville, says, "Our arrangements with the Kentucky Department of Fish and Wildlife Resources and the progress that agency has made in developing wildlife habitat on project lands around Lake Cumberland are most satisfactory. In order that the public may realize maximum benefits from these lands, it is our wish that they be used for as many purposes as is consistent with the primary purposes for which they were acquired."

The Pulaski County District sees in this work an additional opportunity to implement its long range program.

"We are happy to participate in this effort to provide better hunting," says L. G. Colyer, chairman of the board of supervisors, "because one of the district's objectives is to assist in the development of recreational resources, either public or private." ♦

Irrigation planning

A soil survey is essential to irrigation planning. It is the basis for determining if the soils are irrigable and is used by the planner to fit the system to the soil. The location and extent of soils that differ widely must be considered in deciding how an area can be subdivided, if necessary, so that suitable application methods and required amounts of water can be determined.



French Creek Pumping Station at Snohomish was the site of the fish survival study.

Fish survive pumping plant

Cooperative study shows 80 percent of young salmon make trip without injury

By **L. Dean Marriage** and **Richard N. Duncan**

Regional fisheries biologist, SCS, Portland, Oreg., and fishery research biologist, U. S. Bureau of Commercial Fisheries, Pasco, Wash.

Juvenile salmon survived a fast, rough trip through a large flood pump in a cooperative test conducted by the Soil Conservation Service and the Bureau of Commercial Fisheries at Snohomish, Wash.

Objectives of the study were to determine whether young fish can survive the extensive pumping of floodwaters that is a necessary part of land and water management in the coastal plains of the Pacific Northwest and to explore the causes of fish deaths observed.

The study was carried on for 3 weeks in the spring of 1967 at the French Creek Pumping Station, part of the French Creek Watershed Project.

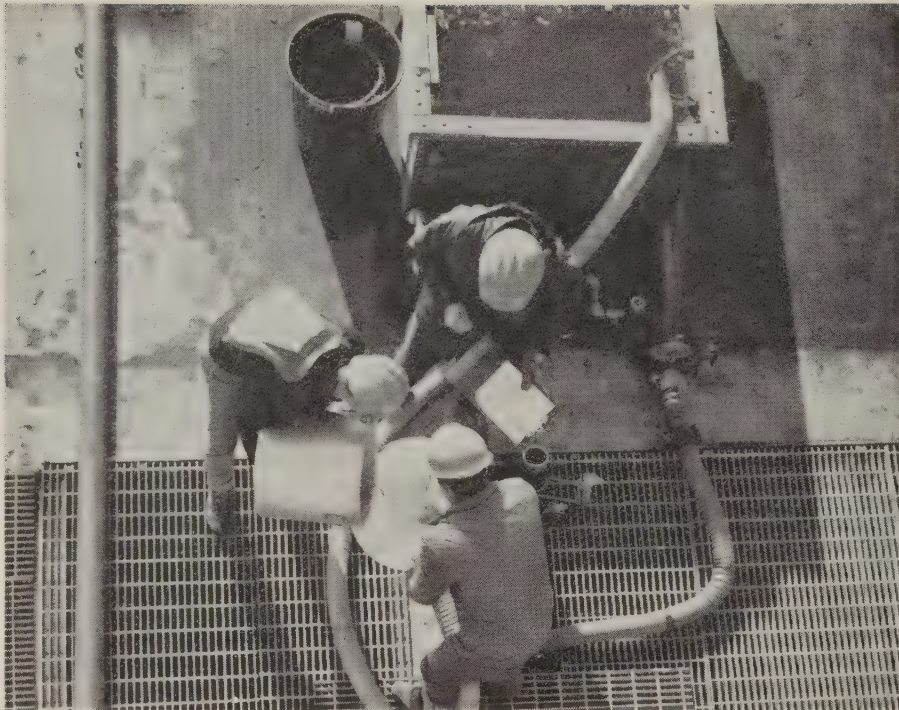
The Bureau of Commercial Fisheries provided funds, experienced help, and time-tested fish handling equipment; Bureau of Sport Fisheries and Wildlife provided juvenile salmon; Soil Conservation Service provided funds, facilities, help, and coordination services; Washington Department of Fisheries provided coho salmon finger-

lings and use of hatchery facilities; Washington Department of Game provided trout; and the French Creek Flood Control District provided the use of its pumping plant.

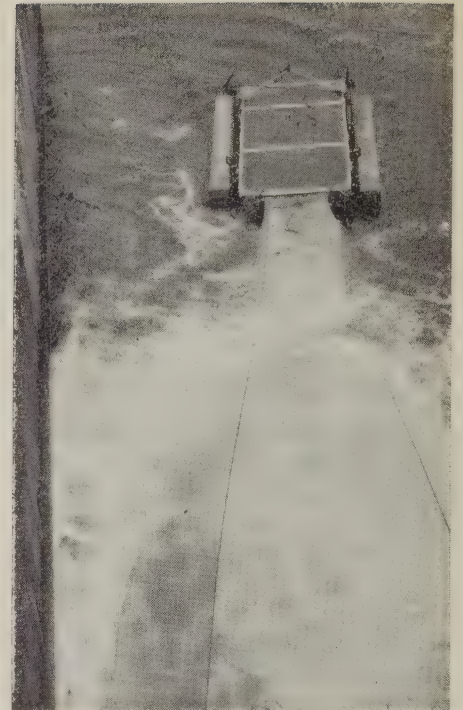
The pump used in the test has a 3-bladed propeller 41 inches in diameter turning at a fixed rate of 440 r.p.m. and delivering about 70,000 g.p.m. at a lift of 9 feet—the average lift during the study. A large steel flap gate was attached to the discharge outlet.

Tattooed fingerlings were picked up at the Washington Department of Fisheries Skykomish Salmon Hatchery at Sultan and transported by truck in specially designed holding pens and live tank to the French Creek pumping plant, about 20 miles away. Each lot consisted of 100 coho salmon fingerlings averaging 4¼ inches long. The fish were tattooed near the head and tail with an identifying pigment.

At the pumping plant, the fish were transferred to plastic buckets and transported to the pump. They were washed into the pump by



Three men, seen from above, pour water and fish into one of three hoses leading to different levels at the pump intake 40 feet below the deck. Funnel is shown at left on one of the hoses. The fish were recovered in a 45-foot long collection net and floating trap (right) attached to the discharge outlet of the pump.



means of 3-inch diameter flexible hose leading from the deck about 40 feet to one of three positions at the intake of the pump.

The fish passed through the pump system to a point below the outlet where they were recaptured in a 45-foot long tapered nylon net and trap attached to the discharge outlet.

The only times the fish were removed from the water were in the tattooing process and in removing them from the trap. All other

transfers were made in water without manual handling.

Back at the hatchery, the live and dead fish were separated, identified by the color of the tattoo mark, and counted. The dead were then examined to determine the cause of death. The live fish were placed in holding pens in a hatchery pond for observation of delayed mortality.

The following results were observed:

(1) Eighty percent of the coho fingerlings passing through the pump survived without injury.

(2) Position of entry of the fish into the pump's intake did not affect the rate of survival.

(3) The flap gate which causes extreme water turbulence was not a factor in fish injuries.

(4) Results of limited tests on different sizes of fish ($1\frac{1}{4}$ to 9 inches long) showed smaller fish survive better than larger ones.

(5) Introducing compressed air into the pump at a fixed rate did not alter the survival rate of fish tested.

(6) Most fish injuries were of a mechanical type that could be caused by the fish coming into contact with the propeller, guide vanes, or diffuser vanes within the pump.

The interagency pooling of experience, finances, equipment, manpower, and fish resources reduced the cost of the study to a fraction of what it would have been for a single agency. The information will be helpful in understanding the effects of pumps on fish and in planning future pump installations for the safety of fish. ♦

River basin surveys

River basin surveys are undertaken at the request of the cooperating State or Federal agencies. They serve to maintain coordination between the upstream watershed aspects for which USDA has responsibility and the downstream problems of water-resource use and development. ♦

Massachusetts improves its public pheasant shooting fields

By E. A. Swenson, Jr.
Biologist, SCS, Amherst, Mass.

When a ringnecked pheasant blasts the air with a whirr over a Massachusetts hunter, it's no accident. Chances are, the bird is there because of cooperative efforts by the Massachusetts Division of Fisheries and Game and the Soil Conservation Service to overcome land management problems associated with decreased private hunting land and increased numbers of hunters.

Since the mid 1950's, the division has directed all of its pheasant management efforts, and about one-third of its stocking, to division-owned or leased public shooting grounds. There are about 30,000 acres in 19 wildlife management areas. Fourteen of the areas contain habitat suited for the release of pheasants.

Management efforts are directed toward providing large acreages of open land where stocked birds are easily available to hunters. Since many of the wildlife management areas were wooded, or on nonagricultural land with soils poorly suited to growing tall grassy cover, specialized vegetation management techniques are needed to produce the required habitat for pheasants. The Soil Conservation Service has cooperated with the game division in developing successful plantings.

The problem was one of developing long-lived easily maintained herbaceous cover suitable for shooting fields. It should be 2 to 3 feet high; dense enough to provide cover for released pheasants, but through which hunters and dogs could easily maneuver; remaining erect until late November; and dense enough to retard the invasion of trees and shrubs.

Two wildlife management areas in eastern Massachusetts were selected as testing areas. One was the Crane Wildlife Management Area at Falmouth and the other was the Myles Standish Wildlife Management Area at Plymouth. Both are on deep droughty sands that had a rank growth of pitch pine and scrub oak.

Clearings were made in the brushy woods by bulldozing, and evaluation plantings were started with assistance from SCS plant materials specialists using plant materials from commercial sources and the SCS. Some 22 species of plants were seeded. The areas were duplicated as new clearings were made.

Pheasants were stocked and the areas were heavily hunted. From 1959 until 1965 the plantings were

increased, observed, establishment methods refined, and evaluations were made.

In late November of 1966, the Massachusetts Division of Fisheries and Game and the SCS made their final evaluations of the plantings.

A mixture of sericea lespedeza and switchgrass had been most successful. The division has adopted a mixture of 20 pounds of Nebraska 28 switchgrass and 10 pounds of sericea lespedeza for developing shooting fields on the sand plains of eastern Massachusetts. The biologists believe that satisfactory cover for pheasant shooting fields can be maintained with the switchgrass-sericea mixture for 20 or more years with only minimal management.

Field evaluations were also made to test annuals used as smother crops on newly cleared woodland openings. Observations indicated that rye provides seed and forage as well as suitable cover during the several years of site preparation needed before final seeding.

Western Massachusetts has an

German millet (foreground) and pearl millet (background) are compared by Massachusetts District Game Manager Charles Styles in an early evaluation of annual "smother" crops for newly cleared game fields.



entirely different set of growing conditions, with heavy till soils, a cooler climate, and a shorter growing season. Additional field testing for that section was done at the Williamstown Wildlife Management Area in the Berkshire Hills of northwestern Massachusetts. Some 22 species representing 13 genera were established on existing fields and on newly cleared openings.

Observations over a period of years ruled out annuals and selected reed canarygrass as best for the highly varied soil complexes of this section of the State. Stands of reed canarygrass are easily established, furnish excellent cover for released pheasants, and are relatively simple to maintain.

Since the first pheasants were raised and released in Massachusetts in 1894, the management problems of providing enough of these sought-after birds have increased. Cooperatively developed land management techniques are now being applied to heavily stocked wildlife management areas and now promise to make pheasant hunting a rewarding, safe, and economically feasible sport. ♦

A wildlife border of sericea lespedeza next to a plowed area and bush lespedeza next to the woodland provides a combination of food and cover.



Satellite tracking station makes bombing range into wildlife area

By James F. Hayden

Work unit conservationist, SCS, Keene, N. H.

A landscape, once cratered and chewed up by the practice bombing and strafing of Navy and Air Force planes, now offers the quiet rustle and splash of abundant wildlife beneath the Air Force's soundless radar signal of the New Hampshire Satellite Tracking Station, New Boston, N. H.

A program that combines military and conservation uses of land, carried on with the cooperation of wildlife and conservation agencies, has earned the station a series of awards for achievement in conservation.

Most treasured are the General Thomas D. White Fish and Wildlife Trophies won in 1964 and 1966 in competition with all U. S. Air Force installations having less than 2,000 acres available for conservation practices.

Conservation achievement

The station has also received two Air Force citations and two Secretary of Defense citations for superior achievement in conservation. Also prized is a trophy from the Federated Sportsmen's Club of New Hampshire for the outstanding water-conservation program in the State in 1965.

Former station commander, Col. Benjamin F. Smotherman, started the program which has been continued under the present commander, Lt. Col. James H. McGahee.

The tracking station was completed in 1960 on an area of about 2,800 acres. About 1,900 acres, including 100 surface acres of ponds, was left untouched until Colonel Smotherman designated it as a conservation area in 1962.

When Ice Pond was stocked with

brook trout by the Department of Interior's Bureau of Sport Fisheries and Wildlife, it created such an interest that the station commander appointed a conservation committee to plan and approve future projects for the station's Air Force and civilian personnel and their families.

The need for security does not allow public use.

Committee members include the commander, director of support, communications officer, base civil engineer, and the executive committee of the Rod and Gun Club.

A wildlife plan

In 1965 the tracking station signed an agreement with the Hillsborough County Conservation District. Aerial photos and soils maps of the station were prepared as part of a conservation plan.

Several agencies helped develop the plan. An SCS biologist and work unit personnel helped plan the land use, management of vegetation and plantings, and development of water bodies. Personnel of the U. S. Bureau of Sport Fisheries and Wildlife made the waterfowl and fisheries part of the plan. Forestry is under the guidance of the Cooperative Extension forester. The plan was reviewed by the New Hampshire Fish and Game Department.

Annually all parties concerned review the plan and decide on the coming year's activities. Heavy equipment from the base civil engineering section can be used on the projects, but volunteers do most of the work during off-duty hours.

About 2,500 brook trout are stocked each year in two ponds re-

claimed to eliminate rough or non-game fish. Access to the ponds has been improved by a new road and by clearing brush from the shorelines. Part of one pond lies outside the base and is open to public fishing with the adjacent landowner's permission.

Base personnel removed old bombing targets from Joe English Pond, one of the main targets for bombing practice, and stocked it with fish. Bass, pickerel, perch, and horned pout now abound in its waters. Woodduck boxes and food plantings attract a variety of ducks and Canada geese. Boating is possible from a new dock and launching ramp. Picnickers use several locations along its shores, and an access road leads to parking areas for hunters and fishermen.

A half-mile-long nature trail has been cleared and marked along the southern shore of Joe English Pond. The natural setting of the lake in the beautiful mountain landscape has been carefully preserved. Trees, shrubs, flowers, and ferns have been identified and labeled for the information of trail users.

Good pheasant hunting has resulted from a pheasant-raising program sponsored by the Rod and Gun Club. Two hundred and fifty chicks, supplied by the State of New Hampshire Fish and Game Department, were raised this year. The club supplies pens, food, and labor for the project. Forty percent of the birds may be claimed by the State if needed for stocking elsewhere.

Farmland formerly part of the strafing range, idle since World War II, was converted to an 18-acre shooting field. The area was cleared, and strips of corn, sudan, oats, and grass were planted for food and cover.

Other projects are a trap shooting range and a 1-acre dugout pond for fishing. Deer, grouse, and rabbits use the 25 acres of grass-legume food plots scattered around the station. ♦

Planning cover for shooting grounds varies with the aims of owners

By Clayton L. Heiney

Wildlife biologist, SCS, Harrisburg, Pa.

There's as much difference in planning wildlife cover for shooting grounds as there is in planning conservation cropping systems for general farms.

Take the case of Dr. Herman Gailey, Jr., of York County, Pa.

Dr. Gailey, a local orthopedic surgeon, wanted a place in the country that he could develop for wildlife and for training his German shorthair pointers. He was primarily interested in getting cover suitable for field trials for hunting dogs.

This turned out to be quite a different matter than growing cover for shooting grounds that emphasize hunting and strive for optimum harvest of game.

In Pennsylvania, commercially regulated shooting grounds use a great deal of moderately high growing vegetation, such as sericea

lespedeza, sudangrass, sorghum, and switchgrass. However, when the grounds are to be used for field trials, the owners prefer perennial low-growing grasses that provide cover less than 2 feet high. The most successful have been reed canarygrass, smooth brome grass, and tall fescue.

Soon after Dr. Gailey purchased his farm, he became a cooperator with the York County Soil and Water Conservation District. Work Unit Conservationist Robert Young and I worked with him in developing a plan for his land. In 5 years, he tried nearly 2 dozen species of grasses and legumes and an equal number of shrubs.

We found smooth brome grass, reed canarygrass, and tall fescues most suitable for field trials because they provide excellent cover for planting of birds, and the veg-

A pheasant flushes from a food patch of sudangrass and sorghum.



etation does not obscure the visitors' view of the trials. Dr. Gailey prefers the perennial grasses to the annuals, such as sorghum and sudangrass, because they require little labor for maintenance.

Now, more than a dozen field trials are held each year on his farm. They attract hunting dog enthusiasts from all over the eastern seaboard.

There were few resident quails, rabbits, or pheasants on the farm when Dr. Gailey bought it. Today all three species are abundant, and the area serves as a reservoir for these animals that spill over onto the nearby farms. ♦

Maine towns plan natural resources

All towns and communities, large or small, in Maine's St. John-Aroostook Resource Conservation and Development Project are making natural resource conservation plans.

One of the project's first objectives is for every town to develop a natural resource plan. The 65 towns in the area, ranging in population from 100 to nearly 15,000 people, are sponsors of the project. Forty-five towns are well started on developing these plans.

A soil map is the basis of each plan. Specialists of the Soil Conservation Service and other resource agencies in Maine have developed soil suitability ratings for more than 30 different land uses. Most towns are using the resulting soil suitability maps.

As the people of a town get together to plan the development of their resources, these maps suggest many possibilities, stimulate progressive thinking, and sometimes reveal reasons for past failures.

Eddie Belanger, town manager of Ashland, referring to the soil suitability map for lagoon sewage disposal, said, "We could have saved at least \$50,000 if we had had this map a year ago." ♦

Town Manager Edgar Searway of Portage says, "If for no other reason, the maps are worth the time put into them just for their catalytic influence on the thinking of the planning groups."

Adrian Jacques, town manager of Madawaska in St. John Valley, says, "The soil maps help us to better solve our flooding and erosion problems."

Natural resource conservation planning usually begins with a meeting of town officials, the planning board, and representatives of Federal, State, and local agencies with natural resource development programs. These representatives explain agency programs and point out the many ways the communities can use the services. The town people review the soil suitability map ratings for many different land uses and then take over.

They hold regular meetings of representatives of service groups, fish and game clubs, women's clubs, chambers of commerce, and interested individuals.

Sylvio Michaud, town manager of St. Agatha, says, "The more people involved, the more interest generated; and this is what gets things done."

At their meetings, the local people develop a list of problems and opportunities. Some towns group together to develop a plan for a larger area. One such group had representatives from four different towns (Haynesville, Bancroft, Reed, and Glennwood). Many towns have comprehensive plans made by private planning consultants.

After studying the facts and the Federal and State services available, the local people make the decisions.

For example, in Nashville (30 people) the plan is to preserve the quality of the water of Little Machias Lake and create a picnic and tenting area for tourists.

In Caribou (12,000 people), the potato capital of the world, the issues are to reorganize the museum, construct a lake for recreation,

build a golf course, study high-cost home construction, and plan for city parking and urban renewal.

Portage officials, because of their large natural lake, think their best opportunities lie in recreation oriented industry.

Even Presque Isle, the recently chosen "All American City," recognizes problems of flooding, erosion, and an unsanitary dump, and plans land treatment and development of recreation, cultural centers, and industry.—S. VON DAY, *RC&D project coordinator, SCS, Presque Isle, Maine.* ♦

Effect of dams on trout streams studied

The Central Aroostook Soil and Water Conservation District, the Maine Department of Inland Fisheries and Game, and the Soil Conservation Service are cooperating on a study of the effect of flood-control dams on trout streams.

One water-temperature experiment in the Libby Brook watershed in Fort Fairfield is at a multipurpose floodwater-retention and recreation lake that has a surface area of 19 acres and a maximum depth of 20 feet.

In the study, a team of biologists will evaluate water-temperature fluctuation in the newly created artificial body of water and the stream below the structure.

As their contribution, the district leased temperature-recording instruments. Kendall Warner, fisheries biologist, Department of Inland Fisheries and Game, and David Allan, SCS biologist, jointly selected the locations for the instruments. Rommy Haines, Jr., son of a Central Aroostook District supervisor on whose farm the dam was built, assisted with the weekly maintenance of the recording instruments. This team found that trout growth and fishing have been excellent in the manmade lake and below the structure.—JOHN C. MALLEY, *work unit conservationist, SCS, Presque Isle, Maine.* ♦

Conservation plan for Attwater prairie chicken

By Joseph T. Surovik, III
Biologist, SCS, Columbus, Tex.

Have you ever seen the nearly extinct Attwater prairie chicken, whose booming and strange courtship dance some say make one of the most thrilling spectacles of nature?

If you haven't your odds are increasing as a result of efforts of the World Wildlife Fund and the Colorado Soil and Water Conservation District.

The Attwater prairie chicken, a native of Texas, is a member of the grouse family and a near relative of the extinct heath hen that formerly ranged in New England.

Millions of the buff-colored prairie chickens once inhabited the flat, tall grass coastal plains of Texas and Louisiana.

A half century ago competitive hunters began shooting the chickens for sport like clay pigeons. And farmers started putting the lush grass pastures into cultivation. Now, only about 1,000 chickens are left.

In 1966, the World Wildlife Fund bought a 3,400-acre tract of land from Mr. and Mrs. David Winterman, I. V. Duncan, and Gardner Duncan, once the range of the largest of four colonies of the Attwater prairie chicken. This land, in the Bernard Prairies southeast of Columbus, Tex., is now known as the World Wildlife Fund Attwater Prairie Chicken Refuge.

SCS conservationists helped the refuge develop a soil and water conservation plan at the time the refuge became a cooperator with the Colorado District.

Dr. Ira Gabrielson, president, and Howard Dodgen, Texas representative, of the World Wildlife Fund; Val Lehman, wildlife manager of King Ranch; Tom Waddel, refuge caretaker, and I helped work out the plan.



Civil Engineer R. K. Curl (left) and the author use soil map and subsoil samples to determine water-holding ability of the soil for a pond on the refuge.

This group also used the resources of the U. S. Fish and Wildlife Service, Texas Parks and Wildlife Department, Texas A&M University, the Cesar Kleberg Wildlife Foundation, and other organizations interested in conservation.

Soil and capability maps by SCS served as a basis for developing the refuge's conservation plan. The work also included a range survey and determination of good sites for ponds and food and cover needs for wildlife.

The World Wildlife Fund is now beginning to put the plan into effect. ♦

Catfish processing plant to be built

Owners Eulon and James Enfinger of Hartford Lake in the Wiregrass Resource Conservation and Development Project, Ala., plan to construct a processing plant for locally produced catfish.

The plans call for a modern plant capable of turning out 10,000 pounds of fish a day and employing about 20 workers. Fish for the plant will be supplied from local ponds throughout the area by contract. More than 400 people desire to contract with the Enfingers to supply the catfish.

The plant is expected to be ready for operation by early summer.—C. F. LYLE, *project coordinator, RC&D, SCS, Ozark, Ala.* ♦

FHA disaster loans

Farmers Home Administration emergency loans to help farmers recover from natural disasters totaled \$94,622,000 during fiscal year 1967. An accounting for the year ending June 30 showed that 22,174 farmers and ranchers throughout the Nation obtained loans to revive operations damaged by storms, floods, drought, freezes, and other hardships caused by the weather. ♦

A conservation plan for wildlife . . .

Game biologists use farm practices to improve public hunting area

By James D. McCall and William B. Barnes

Biologist, SCS, and assistant director, Indiana Division of Fish and Game, Indianapolis, Ind.

The 6,000-acre Glendale Fish and Game Area in southwestern Indiana is an example of where "conservation planning pays off." It is just one of 14 public hunting and recreation areas covering 61,800 acres of State-owned or leased land where good soil and water conservation practices improve the quality of the environment for wild creatures.

George Seketa, area manager for the Indiana Department of Natural Resources, says, "It may require several years to develop this property to its fullest potential. However, the overall conservation plan will guide us to that goal."

Early in 1966, Joe Branco, SCS conservationist working with the Daviess County Soil and Water Conservation District, assisted the fish and game biologists make a conservation plan designed to produce a maximum harvestable crop of fish and wildlife for sportsmen.

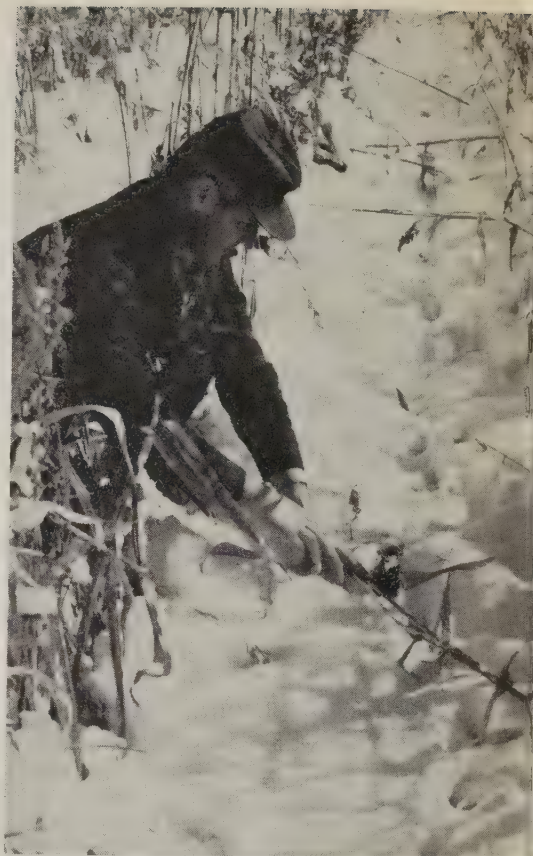
Several conservation practices have already been applied, and more are planned. On the land are a conservation cropping system, crop residue use, grasses and legumes in rotation, stripcropping, critical area plantings, wildlife ponds, firebreaks, fishpond stocking, grassed waterways, livestock exclusion, minimum tillage, plow planting, recreation access roads, tree planting, an erosion-control drop structure, and wildlife habitat development.

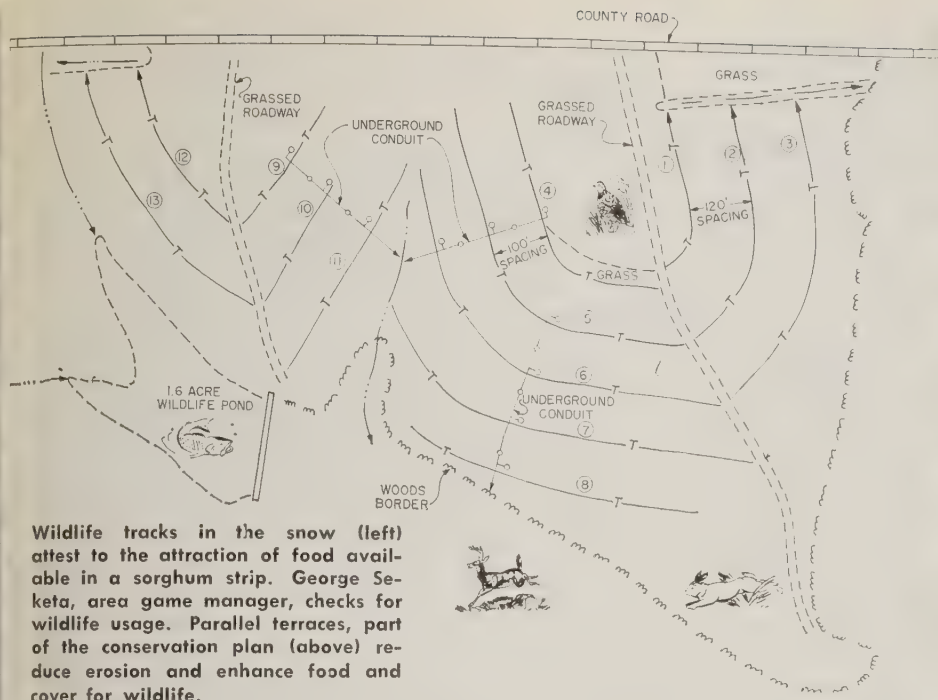
A major attraction is 1,400-acre Dogwood Lake. A water-control dam is now being constructed to create 30 acres of shallow water and will serve as a desilting basin to protect Dogwood Lake. When completed, this marsh will be used

by ducks, geese, muskrats, raccoons, rails, gallinules, and probably more than 100 other species of vertebrate animals.

A system of parallel terraces with underground conduits for erosion control is planned for an area to be strip-farmed for production of wildlife food and cover. Woods and field borders of different heights and densities of vegetation are providing good homes for quail and rabbits. Such borders cannot be maintained if fields are abandoned and allowed to return to hardwoods.

Where the soils have only slight





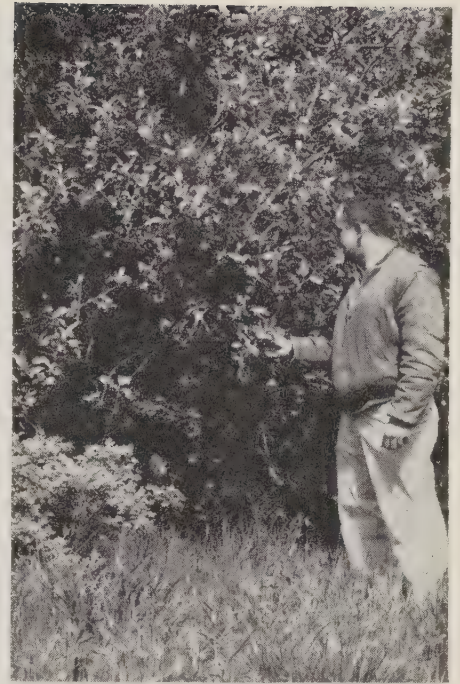
Wildlife tracks in the snow (left) attest to the attraction of food available in a sorghum strip. George Seketa, area game manager, checks for wildlife usage. Parallel terraces, part of the conservation plan (above) reduce erosion and enhance food and cover for wildlife.

limitations for row crops, the game management personnel lays out long, narrow fields. Hedgerows will be planted 200 to 400 feet apart to provide safe wildlife travel lanes. The fields between the woody borders will have a crop rotation including alternate strips of cultivated row crops, small grain, and meadow.

On rolling soils which have a severe erosion hazard, strip mowing is used to maintain the desired plant community.

Some soils lend themselves to a system of terraces, grassed waterways, and long meadow rotations. Other soils are so steep that woodland is the best land use. Still other soils and their associated

Proper land use and good conservation practices produce wildlife for the hunter. Rabbits are plentiful where both food and cover are adjacent throughout the year.



An old apple tree surrounded by brambles, timothy, and bluegrass is a "rabbit factory" in the eyes of Work Unit Conservationist Joe Branco.

topography provide excellent sites for impounding water.

The annual recreational use of the Glendale area exceeded 12,000 visitors before the 1,400-acre lake filled. Similar areas in Indiana have passed the 100,000-visitor mark after developments were completed.

Some of the activities now available at Glendale are hunting of squirrels, quail, pheasants, rabbits, and deer.

Fishing has been limited to the 13 ponds that have been constructed and stocked with game fish. The 1,400-acre lake is now filled and is open for fishing. It will also be open for certain kinds of boating and canoeing. Waterfowl hunting will be permitted outside the refuge area.

There is some berry picking and mushroom hunting. A bird dog field trial drew 250 people during a 2-day period last year. Other developments will provide camping, picnicking, hiking, bird and nature study, and school biology study areas. ♦

A breakthrough for conservation . . .

Capping Palouse hills promises answer to erosion damages

By Clarence A. Kelley

Work unit conservationist, SCS, Cheney, Wash.

"For a long time I've wanted to see those hills capped with permanent cover. Now it's actually happened."

Floyd Simpson, a Palouse wheat farmer who operates a 650-acre farm 15 miles west of Spokane, Wash., gazed across fields to the north and west.

Like many a Palouse farmer, Simpson has noted, with growing apprehension, the problem of erosion on the steep side slopes adjacent to the hilltops.

"I can remember times when every slope had ditches showing the effects of erosion," Simpson says. "North slopes of the rolling hills are the worst, being much steeper and with greater frost hazard than the south slopes."

Four years ago, during a farm planning session with an SCS soil conservationist, Simpson took the first step towards capping the hills of the farmland with permanent cover of alfalfa and perennial grasses.

Typical Palouse country has deep silt soils and rolling topography, with side slopes as steep as 55 percent. Much of the 19-inch average annual precipitation comes in the form of snow. Low winter temperatures and late springs result in snowmelt and runoff over frozen soil.

Compounding the problem are the outcroppings of lime deposits and finer-textured soils that have resulted from the loss of the surface mantle of silt through erosion. Sixty years of excessive tillage and compaction with heavy equipment have added to the problem. Hilltops and upper slopes are now showing a mixture of clay

and lime low in organic matter, low in fertility, low in productivity, and low in permeability.

An aerial photograph and a detailed soil survey of Simpson's farm pinpointed problem areas—although their existence was not news to him.

The big question was: What to do about them?

Finding the answers began with a review of various cropping alternatives adaptable to the area. These ranged from a long-term ro-

tation of grass and alfalfa with grain to a short-term system of grain and fallow in alternate years.

The trouble in this "in-between" rainfall area of southwest Spokane County is that moisture may be too low one year and too high the next. With too little moisture, the farmer may be seeding in dust; with too much rainfall, the exposed hilltops may be unable to absorb the excess, resulting in runoff down the steep slopes taking soil with it.

For Simpson, the best answer was to cap the hills with permanent grass and alfalfa seedings. This meant taking the steep slopes and ridges out of grain cropping altogether and establishing permanent cover on the critical erosion areas. The seedings were to extend down the slopes to the point where chiseling or uphill plowing was practical.

Dave Simpson cuts alfalfa-grass hay from hilltop seedings that now cover about 15 percent of his cropland.





Diversions were considered but were decided against because of the steep slopes and lack of natural outlets.

This 650-acre farm had more than 100 acres of the problem areas. Considerable expense would be involved in seeding to permanent cover. The overall cropping system would have to be changed. Clearly, the transition would have to be extended. It was decided to seed about 35 acres each year until the project was completed.

The Spokane County Agricultural Stabilization and Conservation Committee has established a special hilltops seeding practice, paying 70 percent of seeding costs on eroded lands. Cost-sharing was made available to Simpson under this special practice.

The seeding program is now completed on Simpson's farm.

"I was lucky," he said, "getting some good stands of grass and alfalfa. It was a little slow to come up on some north slopes—but it's up and growing now."

Bands of grass and alfalfa (above) now cap the tops of hills and cover the steep upper slopes on Floyd Simpson's Palouse farm. The author (below) points out rill erosion and soil slippage on similar land left bare after fall plowing.



Simpson cuts no hay on north slopes. Such areas remain undisturbed for soil protection. The

permanent alfalfa-grass stands also provide cover for ring-necked pheasants of the area.

Hay yields on the caps average $1\frac{1}{4}$ tons per acre—"not a get-rich-quick proposition," Simpson admits.

"But now grain crops on higher class soils are doing better. I guess in the long-run it's a break-even project from the standpoint of cash crop returns."

It's more than a break-even, though, for soil, water, and wildlife conservation. It's a distinct break-through for recognition of long-term benefits to be gained in capping the Palouse hills with permanent cover. ♦

District names winning farmer

The Loma Blanca Soil and Water Conservation District named one of its cooperators, Felipe Lucio of the La Mesa Community west of Rachel, Tex., "The Outstanding Farmer of the Year."

Lucio started farming in 1959 with 20 acres of cropland, 79 acres of brushland, and 1 acre for the farmstead. He believed cash crops of cotton and watermelons would bring enough money to clear the farm of brush. He learned that prolonged dry weather can reduce crop yields to where little profit can be made. He was determined to continue farming and sought assistance from the Loma Blanca District in 1962.

A conservation plan developed with the assistance of the Soil Conservation Service helped Lucio improve his 100-acre dryland farm by changing from cash crops to a grass and beef operation.

Of the 40 acres of brushland already cleared, Mr. Lucio planted 17 acres to buffelgrass in 1964. The Agricultural Stabilization and Conservation Service provided cost-sharing assistance.

Lucio started the change of land use to buffelgrass and forage sorghums to grow feed for his commercial crossbred beef animals. He fenced the farm into three pas-

tures of 17, 22, and 40 acres, and kept 20 acres in cropland.

He currently has 14 animal units and with the grass establishment completed by 1969 will be able to maintain 20 animal units under good pasture management.

Lucio's accomplishments will be entered in the Goodyear Tire and Rubber Company's National Soil Conservation District Awards Program.—WELLAND A. WATSON, work unit conservationist, SCS, Falfurrias, Tex. ♦

District helps handicapped artist



Bill Anderson stands by the poster he painted for the Lycoming District.

As part of a handicapped young man's sign-painting instruction, the Lycoming Soil and Water Conservation District, Pa., commissioned William Anderson to paint a poster on the theme, "Help Keep our Land Beautiful."

The poster "Our Land Beautiful" is the result.

Mr. Anderson was born without arms or legs. Striving to overcome his handicap through education, he has developed his artistic talents in a most unique manner. By holding the sign painting brushes between his shoulder and chin, he is able to create excellent posters and signs.

This poster took 119 hours to complete and is part of an instruc-

tion course Bill is taking at the Williamsport Community College. ♦

Financial Assistance Through Loans and Cost-Sharing

Financial assistance through loans and cost-sharing with individuals and groups in establishing certain conservation practices is provided under the Agricultural Conservation Program; through loans and cost-sharing under the Watershed Protection and Flood Prevention Program, Resource Conservation and Development projects, and the Great Plains Conservation Program; and through the State Forestry departments. ♦

Cranberry growers reshape bogs for water picking

By William H. O'Donnell

Conservation technician, SCS, Mount Holly, N. J.

New Jersey cranberry growers are drawing on Soil Conservation Service experience in water management to make bog layout, dikes, and water-storage dams compatible with a new water-picking method. Soil conservation district cooperators have the assistance of SCS specialists in planning and installing their new water-control systems.

A bog size of 4 to 5 acres seems best for the type of water picker used in New Jersey. With this size, a crew of three or four men can pick, float, and remove the cranberries in 1 day.

For this mechanized operation, dikes are built in parallel at 200-foot intervals. After a core trench is dug to give a firm foundation of mineral soil, sand is trucked in to build and shape each of the dikes.

SCS specialists put up stakes to help growers determine proper



Precisely leveled bogs are needed for uniform ripening of cranberries and efficient operation of the picking machines (above). Squares of cranberry vines, cut from the construction area, are used to stabilize sides of a new dike (left below) in the Burlington County Soil Conservation District. In the water-picking method, cranberries are floated to near the dike where they are picked up and loaded into pallet boxes on trucks (below).



grade and width. Dikes are normally 1 foot higher than the winter flood elevation and 12 feet wide at the top with a slope of $1\frac{1}{2}$ (horizontal) to 1 (vertical).

When the core trench is dug, a layer of vine growth is laid aside to be used on the sides of the dike to prevent bank sloughing. Around water-control structures, or trunks, this turf is usually laid in brick fashion.

In some trial plantings, a weeping lovegrass-jute mesh cover has shown promise for stabilizing dike

sides until native vegetation is established.

Dams for water storage are more complicated than the low dikes that separate bogs. The trunk is altered to form a pipe spillway, and an emergency spillway is added to safely carry from 90 to 95 percent of the flow from a 25-year frequency storm. SCS helps with the design of the dam and recommends seeding with adapted plant covers such as Kentucky 31 fescue, weeping lovegrass, and sericea lespedeza. ♦



Thai farmer gets assistance

Fish to supplement his family's diet of rice and vegetables and fish for market are the early rewards of a Thai farmer's practice of soil and water conservation with the help of the Thailand Department of Land Development and the USDA Soil Conservation Service's technical aid team.

Ten months after Nai Kod completed his fish ponds and stocked them with fingerlings provided by the Thai Fisheries Department, he harvested 210 kilograms (about 470 pounds) of fish and sold them in bulk to a local fish merchant for 2,100 baht (about \$105). About 100 kilograms of fish were eaten by the Kods and their neighbors.

The Kods live in Ban Kok Su village in Changwad Kalasin province of northeast Thailand. Technical assistance in planning the ponds and the rest of the farm was provided by Khun Sunthorn, chief of the Kalasin Mobile Conservation Team, formed as part of the conservation program under a joint agreement between the Thailand government, the U.S. Agency for International Development, and the U.S. Department of Agriculture.

In addition to the fish ponds, Nai Kod is planting a coconut orchard on gradient terraces and along the edges of two grassed waterways. These waterways will safely convey the surplus rainwater down the 4 to 5 percent slopes and into the pond area.

A compost pit is being used to produce fertilizer and mulch material for the new coconut orchard. A good fertilizer program supplemented by green manure, a systematic rotation of upland crops, contour cultivation along

the terraces, good seed varieties, and insect and weed control, round out the conservation plan.—CLYDE T. LOWE, *soil conservation adviser, SCS, Kohn Kaen, Thailand.* ♦

Molasses for the pepper fields

How specialized can you get? Everybody knows the McIlhenny Company as a major producer of pepper in Louisiana.

Growing pepper is a specialized kind of farming with its own special soil management problems. The McIlhenny folks and the Soil Conservation Service folks have come up with their own special answer to the problem of conditioning soil after land grading has removed the topsoil.

They spread molasses on the land to add organic matter and restore tilth.

Pepper fields are precision graded to reduce erosion and to manage water for better drainage and irrigation. In the process of landforming on the McIlhenny farm in the Iberia-Vermilion Soil Conservation District, about 3 feet of soil was removed. The first year after the grading, the exposed subsoil produced very little growth of soybeans or pepper.

The McIlhenny Company with the assistance of SCS formulated a plan to incorporate available by-products of sugarcane, rice, and livestock into the soil.

One of the field trials was the application of sugarcane molasses at the rate of 5 tons an acre on newly graded pepper land. Early results are encouraging.

The molasses penetrated the soil well. Since it consists largely of sugars, it provided food for fungus growth and other micro-organisms. The fungus decomposed and created a residue of humus-like material that had a profound effect on the physical condition of the soil.

The McIlhenny Company is well pleased with the pepper yield from the land treated with molasses and with finding a profitable use for a byproduct of an important local crop.—DOLAN KLEINPETER, *work unit conservationist, SCS, New Iberia, La.* ♦

America The Beautiful Photos in Corn Palace

The renowned "World's Only Corn Palace" in Mitchell, S. Dak., now proudly displays the "America The Beautiful" agricultural parade of the States exhibit produced by the SCS.

These "America The Beautiful" prints were provided by the Davison County Soil and Water Conservation District supervisors and were framed and mounted by the Mitchell Chamber of Commerce and hobbyist, William Doescher. The photos hang in the corridors of the Corn Palace and are exhibited as part of the daily tours conducted during the summer months for about 250,000 tourists from all parts of the United States and other countries. The tourists come annually to view the striking agricultural mosaics made of the many different colored ears of corn.

Now they seek out their home State photo from among the 52 photographs in natural color representing soil and water conservation activities of farmers and ranchers in each of the 50 States, Puerto Rico, and the Virgin Islands. During other seasons the pictures will be viewed by thousands of persons attending stage and athletic performances.

The Corn Palace has a history dating back to pioneer days. The original Corn Palace was constructed in 1892, and the present structure built in 1905 was remodeled in 1965 at a cost of about \$750,000.

Each year the palace is rede-

decorated during Indian Summer for about \$15,000. This redecoration requires around 2,000 or 3,000 bushels of corn, all in their natural color. The individual cobs, with the corn on, are sawed lengthwise; the halves nailed, flat side in, to wooden panels fastened to the brick walls of the building.—JAMES C. HUNT, *work unit conservationist, SCS, Mitchell, S. Dak.* ♦

Plants, soil used to purify sewage effluent

Plant-soil filters may help convert sewage effluent into water for cities and farms, reports Dr. Herman Bouwer, researcher at the USDA Water Conservation Laboratory at Phoenix, Ariz.

Effluent from a sewage-treatment plant is channeled through grass-covered basins. The grass increases flow turbulence, thus hastening replenishment of oxygen in the water. It also provides an anchoring place for aerobic bacteria that digest organic substances in the water.

The water is further purified as it percolates through the soil. By providing a prepercolation treatment of the water, the grass may increase the rate at which the basins can accept water.

The potential of plant-soil filters is twofold: They can be used to recharge ground-water supplies in arid regions such as central Arizona, where the water table is being lowered at a rate of about 10 feet a year; and they can help reduce stream pollution in the humid East, either by cleaning sewage effluent before it reaches waterways, or by cleaning it and pumping it up as ground water without ever discharging it into the waterways. ♦

Soil conservation protects soil

Soil conservation concerns itself with using the land as efficiently as possible while protecting the soil. ♦

Meetings . . .

Resources conference devoted to preserving human environment

“Balancing Future Resource Uses” will be the theme of the 33d North American Wildlife and Natural Resources Conference in Houston, Tex., March 11-13.

Human environment and what can be done to preserve and improve it will be discussed by distinguished speakers in two general sessions. The first of these, “Balancing Future Resources,” opens the conference on Monday morning, March 11.

The second general session, “Achieving a Better Environment,” closes the conference on Wednesday afternoon. The rest of the time will be devoted to six technical sessions. These include “Forest and Range Resources,” “Field and Farm Resources,” and “Exotic and Endangered Wildlife.”

Resource administrators, biologists, outdoor writers, and other conservation-minded persons will be attending from the United States, Canada, and Mexico. There will also be representatives from Europe and Africa. All sessions are open to the public, and there is no charge for registration.

Dates and places

March 8-10, National Wildlife Federation, Houston, Tex.

10-12, National Research Council, Washington, D. C.

10-13, The Wildlife Society, Houston, Tex.

10-14, Association for Supervision and Curriculum Development, Atlantic City, N. J.

11-13, North American Wildlife and Natural Resources Conference; Houston, Tex.

12-16, American Camping Association, Boston, Mass.

25-28, Associated General Contractors, Dallas, Tex.

29-30, National Conference on Rural Health, Seattle, Wash.

29-Apr. 2, National Science Teachers Association, Washington, D. C.

29-Apr. 2, National Farmers Union, St. Paul, Minn.

April

1-5, National Council of State Garden Clubs, Biloxi, Miss.

29-May 3, League of Women Voters, Chicago, Ill. ♦

“Live with nature” is wildlife week theme

Conservation education as the key to good resource use and management will be the highlight of this year's National Wildlife Week, to be observed March 17-23.

“Learn to Live With Nature” is the theme for the special week during which many special events and programs will be arranged by conservation organizations in cooperation with the National Wildlife Federation throughout the country to call attention to the need for intelligent use and management of all natural resources.

In stressing the importance of conservation education, the federation points out that conservation should be a part of every school program, and at the same time the adult community should be made aware of conservation needs in maintaining a quality environment.

Local programs will be planned under the guidance of State chairmen named by the federation. Among the special observances suggested by the federation are such things as conservation programs for civic, church, and youth

groups, news features and radio and TV programs on conservation, window displays and special exhibits, and poster and essay contests for schools.

The annual Wildlife Week observance dates back to 1938 when President Franklin D. Roosevelt issued the first nationwide proclamation to mark the occasion. ♦

Conservation Commandments

(1) **STUDY** the land so that each acre may be used wisely according to its capabilities and treated according to its needs.

(2) **GUARD** well the living soil, that it may continue to nurture man:

Clothe it lovingly with vegetation,
Hold on to it tenaciously,
Restore its fertility and organic content,
Improve it as a legacy for posterity.

(3) **REVERE** water, the lifeblood of civilization:

Retard it on the surface,
Trap it in the soil,
Guard its purity zealously.

(4) **CHERISH** forests that they may—

Conserve water,
Shelter wildlife,
Provide for our needs,
Restore our tranquility.

(5) **RESPECT** all living things as having a role, however humble, in the balance of nature.

(6) **PROVIDE** living museums, samples of primeval America, to be managed by nature alone, so that they may—

Serve as reservoirs of wild species that may be needed tomorrow,
Provide control areas against which man's efforts at management may be measured.

(7) **LEARN** to live in harmony with nature in an ecological symphony, a mutually beneficial dependency.—M. GRAHAM NETTING, director, Carnegie Museum. *Reprinted from Carnegie Magazine.* ♦



Shooting Preserve Management: The Nilo System. BY EDWARD L. KOZICKY AND JOHN MADSON. 1966. *The Winchester Western Press, East Alton, Ill.* 311 pp., illus. \$4.95.

Important to any new business are tested specifications for the physical plant and reliable do's and don'ts for its operation. This book goes a long way toward providing this kind of information for shooting preserves.

A shooting preserve is a specially developed area upon which pen-raised game birds are released for sport hunting. It is a recreational enterprise, organized and operated for the purpose of providing good shooting for a stipulated price.

Shooting preserves have nothing to do with wild game; the birds that are shot have been carefully reared and conditioned for that purpose. Nevertheless, a well-planned, carefully run shooting preserve provides challenging, fast, and realistic shooting.

Although the shooting preserve idea is an old one, its real development has occurred in the past 15 years. As cities grew larger, nearby hunting opportunities became fewer. At the same time personal incomes increased and shorter working hours provided more time for recreation. From these and associated factors came a need for a type of sporting opportunity that shooting preserves provide.

This book discusses practically every aspect of shooting preserve development and management. Included are detailed discussions of how to buy, rear, house, feed, release, and hunt the four game birds commonly used on shooting preserves: mallards, pheasants, bobwhite, and chukars.

Of equal importance are the dis-

cussions of economics, insurance, promotion, safety, and many other matters important to the operator of a shooting preserve.

Anyone concerned with the operation of a shooting preserve or contemplating such a business will find this book to be exceedingly helpful.—LAWRENCE V. COMPTON, head biologist, SCS, Washington, D. C.

The Agricultural Research Service. BY ERNEST G. MOORE. 1967. 244 pp., illus. *Frederick A. Praeger, New York.* \$5.95.

Although this is the ninth book in the Praeger Library of U. S. Government Departments and Agencies, it is the first to deal with an agency of the Department of Agriculture.

And although the author was for many years director of information for the agency, he takes this means of calling attention to the generally poor job the Agricultural Research Service has done in "tooting its own horn."

For example, how many people realize the part ARS played in bringing penicillin into wide use; making plastics from castor beans; developing drip-dry cotton, frozen orange juice, instant mashed potatoes, and shrink-proof wools; developing crime detection techniques; and inventing the aerosol container?

Mr. Moore has done a superb job of showing that the clientele served by ARS is far broader than farmers alone; that, in fact, the work of the agency has impact on urban and rural people alike. Protecting man, his animals, and his plants against diseases and insects; learning better ways to improve, protect, and use the Nation's two basic resources—soil and water; and contributing to the Nation's efforts to help other countries feed, clothe, and shelter their people are but three general examples.

In addition to telling the story of the functions and contributions of ARS, Mr. Moore takes his readers behind the scenes and speaks

candidly about internal weaknesses and methods of operation. His references to dealings with the Congress, the tightrope ARS officials must walk between the Administration position and wishes of members of Congress, and how outside pressures often bring about actions long sought within the agency itself, will be enlightening to readers outside of Government circles.

Many in and out of USDA will be disappointed that more details aren't given on the struggle between the States and the Department leading to the establishment of the Cooperative State Research Service. Many will be interested to learn, however, that several well-known agencies of the Federal Government not now in USDA originated there. Among these are the Weather Bureau, the Bureau of Public Roads, Fish and Wildlife Service, and the Food and Drug Administration.

The only error of concern to SCS readers is the implication that the periodic statements of SCS research needs are addressed to only a single division of ARS. As a matter of fact, these statements of research needs go to the State Experiment stations, the Forest Service, and the Fish and Wildlife Service of USDI, as well as to several divisions of ARS.

This is a fascinating account of one of our sister agencies in the Federal establishment. I can hardly wait to read others dealing with agencies in USDA.—D. M. WHITT, *director, Plant Sciences Division, SCS.*

Pockets of Hope: Studies of Land and People. BY MARTHA E. MUNZER. 1967. *Alfred A. Knopf, New York (for the Conservation Foundation)*. 209 pp., illus. \$4.50.

"Pockets of Hope" are five depressed regions where the people by their own efforts have made viable communities in which to live, work, and play.

Martha Munzer tells their experiences in the latest of a series

of books for young people prepared under the sponsorship of the Conservation Foundation.

The regions are the coal mining area of Wilkes-Barre, Pa., the lands occupied by the Santa Clara Pueblo Indians in New Mexico, the iron country of Marquette, Mich., the Johnson Creek watershed in the cotton country of Tennessee, and the panhandle of southeastern Alaska.

Each story includes a brief history of the region and of the use of its natural resources. More detail about current problems and how present-day leadership has motivated the people to self-help and cooperation with the Government, with less about history, might have helped the reader understand better what made the people's ambitions and desires come true.

Even so, this book makes excellent reading for anyone interested in history, people, and resource development.—JAMES F. HUGHES, *Resource Development Division, SCS, Washington, D. C.*

New publications

Sediment—It's Filling Harbors, Lakes, and Roadside Ditches. 1967. *USDA Agr. Inf. Bull.* 325. 16 pp., illus. \$0.15. The bulletin states that there is no longer any doubt that erosion and sedimentation are many times as costly as soil conservation and presents data to support this conclusion. It supersedes *Agr. Inf. Bull.* 174, "Sediment Is Your Problem—Wasted Soil and Water."

Sediment is a national problem. It damages crops and cropland, reservoirs and ponds, roads, railroads, and navigation channels. It causes more frequent floods and hurts recreation and public health. Sediment comes from farmlands, riverbanks, roads, construction sites, and industrial and mine wastes.

Some of the practices to reduce sediment are contour farming, terracing, contour stripcropping, controlled grazing, returning steep cultivated land to woods or pasture, and stabilizing stream channels. Builders can control sediment by providing temporary cover, such as annual grasses and small grains, or sod, mulch, burlap, or plastic.

This booklet pictorially shows examples of the problems and its remedies.

Irrigated Pastures for Forage Production and Soil Conservation in the West. BY JOSEPH W. TURELLE AND WAYNE W. AUSTIN. 1967. *USDA Farmers' Bull.* 2280. 22 pp., illus. \$0.15. Superseding *Farmers' Bulletin* 1973 on the same subject, this bulletin recommends the use of irrigated pastures when the pastures produce greater net returns per acre than other field crops, and frequently they do. A pasture planning program; tables listing major grasses and legumes, soil moisture interpretation, rotation grazing, and different levels of management; starting the plants; managing established pastures are presented.

Tourism and Recreation. BY ARTHUR D. LITTLE, INC. 1967. *U. S. Dept. Commerce, Econ. Develop. Admin.* 301 pp. Surveys much of the research already done in the field of domestic travel and outdoor recreation in the country and assembles a broad data base to aid in planning and promoting a wide variety of outdoor recreation and travel activities and in measuring their impact on the regional economy. The study was made under contract with the Economic Development Administration.

Farm Commodity and Related Programs. 1967. *USDA Agr. Hbk* 345. 150 pp. \$0.45. Compilation and summary of farm commodity and resource programs for which price support, stabilization, and related programs are administered by USDA; supersedes *Agricultural Information Bulletin* 135, *Price Programs*.

Science and Saving Water and Soil. BY AGRICULTURAL RESEARCH SERVICE. 1967. *USDA, Agr. Inf. Bull.* 324. (12 pp.), illus. \$0.20. A popular account of some of the ways that research scientists have helped find answers to a wide range of problems in controlling and using water and in reducing soil erosion and sedimentation.

Managing Public Rangelands. BY RICHARD S. DRISCOLL. 1967. *USDA AIB* 315. 30 pp., illus. \$0.15. Presents the basic principles of various grazing practices and systems that might be used on National Forests and National Grasslands.

White Americans in Rural Poverty. BY ALAN R. BIRD AND JOHN L. MCCOY. 1967. *USDA Agr. Econ. Rpt.* 124. 18 pp., illus. Estimates concerning the extent of the white poverty problem based on an extension beyond the census definition of rural to include all nonmetropolitan territory outside of central cities and urban fringe.

Conversion of Chaparral Areas to Grassland. BY JAY R. BENTLEY. 1967. *USDA Agr. Hbk 328*. 35 pp., illus. \$0.30. Information applies to the chaparral within the brushland zone that lies below California's commercial timber belt and includes about 11 million acres of chaparral and associated types and 9 million acres of woodland types.

Atlantic Continental Shelf and Slope of the United States: Geologic Background. BY K. O. EMERY. 1966. *U. S. Geol. Surv. Prof. Paper 529-A*. 23 pp., illus. \$0.30. First of a series of reports that describe the geological, biological, and hydrological characteristics and the geological history of the continental shelf, slope, and rise of the Atlantic Coast of the United States.

Sprinkler irrigation. BY CLAUDE H. PAIR. Rev. 1966. *USDA Leaflet 476*. 8 pp., illus. Describes different systems and recommends use on soils that have high intake rates, on fields that have steep slopes or irregular topography, and on soils that are too shallow to be leveled.

The Disparity Between Present Rates of Denudation and Orogeny. BY S. A. SCHUMM. 1963. *U. S. Geol. Surv. Prof. Paper 454-H*. 13 pp., illus. \$0.20. It is concluded that hillslope form is more a function of the difference between the rates of hillslope erosion and stream incision than of rates of uplift.

Erosion and Deposition Produced by the Flood of December 1964 on Coffee Creek, Trinity County, California. BY JOHN H. STEWART AND VALMORE C. LAMARCHE, JR. 1967. *U. S. Geol. Surv. Prof. Paper 422-K*. 22 pp., illus., with maps in pocket.

Poison Ivy, Poison Oak, and Poison Sumac. BY DONALD M. CROSS AND DAYTON L. KLINGMAN. Rev. 1967. *USDA Farmers' Bull. 1972*. 16 pp., illus. \$0.10. Identification, precautions, and eradication given.

Saving the Forests and Related Wildlife Resources From Insects and Diseases. Rev. 1967. *USDA PA-666*. 12 pp., illus. Booklet outlines the U. S. Forest Service's responsibility to protect the Nation's forests against destructive pests. It supersedes PA-593, "Holding the Line."

What You Can do About Water Pollution. 1967. *U. S. Dept. Int., Federal Water Pollution Control Admin.* \$0.10. A colored folder showing that the builder, the farmer, the industrialist, the boat owner, and everybody can do something about water pollution.

Farm Costs and Returns: Commercial Farms by Type, Size, and Location. Rev. 1967. *USDA Agr. Inf. Bull.*

230. 101 pp., illus. \$0.55. An estimate of costs and returns for 1966 and other recent years on 44 important types of commercial farms in 25 major farming areas in the United States as well as a brief analysis of changes that have occurred in production, prices, income, and costs for each of these types of farms.

Financing Industrial Development Through State and Local Governments. 1967. *USDA Agr. Econ. Rpt. 128*. 14 pp. Provides basic information about the way States can provide financial assistance to new firms and those that wish to expand or relocate.

Supplement to Age of Transition—Rural Youth in a Changing Society. BY ECONOMIC DEVELOPMENT DIVISION, ECONOMIC RESEARCH SERVICE. 1967. *USDA Supplement to Agr. Hbk. 347*. 41 pp.

Age of Transition: Rural Youth in a Changing Society. 1967. *USDA Agr. Hbk. 347*. 92 pp., illus. \$0.75. Produced in USDA in cooperation with the Departments of Labor; Interior; Health, Education, and Welfare; the Office of Economic Opportunity; and the President's Council on Youth Opportunity, as well as a number of private organizations. It supplements the information

and insights provided by the National Outlook Conference on Rural Youth and serves as a resource for work in behalf of rural youth at State and local levels.

Weather and the Hand of Man. 1967. *U. S. Dept. Commerce, Environmental Sci. Serv. Admin.* 16 pp., illus. \$0.30. Discusses the modern era of weather modification.

Differential Assessment of Farmland Near Cities. BY PETER W. HOUSE. 1967. *USDA ERS 358*. 39 pp., illus. Experience in Maryland through 1965.

Soil surveys

Ionia County, Michigan. BY GEORGE THRELKELD AND STANLEY ALFRED. 1967. 167 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by Carl Eby, Lynn Kannenberg, Warren Studley, W. A. Van Eck, Robert Johnson, Richard Larson, and Karl E. Pregitzer.

Carroll County, Virginia. BY W. E. THOMAS, JR., L. E. WILLIAMSON, D. L. SMITH, R. L. HODGES, F. W. HURSEY, AND G. V. WILSON. 1967. 109 pp., illus.; maps 4 inches to the mile (1:15,840).

Republic County, Kansas. BY C. H. ATKINSON AND DONALD A. GIER. 1967. 61 pp., illus.; maps 3.17 inches to the mile (1:20,000).

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From the Administrator:

Wildlife Is Not a Resource Apart



In his recent statement of conservation policy, *Resources in Action*, the Secretary of Agriculture reiterated a position always subscribed to by the Soil Conservation Service: that no resource can be managed by itself and that no resource agency can carry out its program independently of others.

"A narrow piecemeal approach of dealing with one resource, or one use, or one purpose at a time cannot provide lasting solutions," says the statement on USDA Responsibilities in Creative Conservation.

"Nor can it build harmony into the dynamic ecological system that is man's total environment. Rather, through skillful coordination of uses and planned management of resources, we can and must reverse the downward trend in the quality and adequacy of the natural world in which we live.

"Only through widespread positive actions designed to blend uses harmoniously can we protect and sustain our natural environment and produce optimum combinations of goods and services from the Nation's soils, forest, range, water, wildlife, and other resources."

The necessity and the success of coordinated effort—with respect both to the various resources and the various agencies—is nowhere better illustrated than it is with fish and wildlife.

Wildlife, like man himself, is completely dependent on the other natural resources—soil, water, and plants—as elements of its environment. Obviously, it is a resource that cannot be "conserved" or managed apart from the others. By the same token, conservation

agencies concerned with wildlife must work in concert with all those dealing in any way with land, water, forests, or grassland.

The Soil Conservation Service is progressively strengthening its working relationships with the agencies responsible for the Nation's wildlife resources. A recent and fruitful development is the Joint Soil Conservation Service-Fish and Wildlife Service Coordinating Committee on Watershed Development.

Through that committee, small watershed programs are evaluated, interagency coordination is promoted, and special problems studied and solved. The committee members agree that small watershed work plans must consider all natural resource interests. They recommend that fish and wildlife considerations be presented factually to the sponsors of each project. In many cases, a joint biological report endorsed by the State, the Fish and Wildlife Service, and SCS is prepared evaluating the fish and wildlife resources of the project area and recommending habitat protection and improvement measures.

An example of cooperation on a broader scale is the International Migratory Bird Committee, created several years ago to provide a forum for the informal consideration of waterfowl management problems in Canada and the United States. A representative of SCS serves on this committee as it seeks ways to safeguard a wildlife resource that moves back and forth across international boundaries and depends on the land and water resources of both countries.

The goal of such cooperative effort is of deeper concern than the

size of the hunter's bag or the income a landowner may derive from the recreational use of his land. Not only the game species but all forms of wildlife are important to people in many different ways—to countless people who never use a gun or fishing rod as surely as to those who do. The maintenance and improvement of wildlife habitat is at the same time the care of the environment of man himself.

Only recently have we begun to recognize the responsibilities and obligations that go with man's domination over nature. We have been late to see that our environment is also the environment of the other creatures of earth and that we need them for esthetic and spiritual reasons whether or not there is any economic value involved.

Now we are learning that we want—and need—the scene as we remember it from other times and places, or as we have had it described to us by others more fortunate. Now we are becoming disturbed to find country roads used as trash dumps, incensed to find old tires and tin cans in fishing streams, broken glass and tar on the beaches, turbid polluted water in lakes.

As stated in the Agriculture/2000 publications, it is USDA policy—recognizing both man's needs and obligations—to work toward a better and more wholesome environment for all, to develop rural communities where the benefits of community living are accompanied by enjoyment of a beautiful countryside, to help fight erosion and floods and pollution and other despoilers of natural beauty.

The Soil Conservation Service sees as an important part of its role the protection and improvement of quality of environment for both wildlife and people.

Surely, such an important purpose is worthy of the best efforts of every landowner and every resource agency.

D. A. WILLIAMS



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Conservation in Tunisia a better way of life

By James G. Moorefield

Work unit conservationist, SCS, Wichita, Kans.

The village of La Kesra in Tunisia overlooks the upper reaches of the Marguellil River watershed, a 60-mile long valley of severe drought and floods and of too many people and livestock for its meager resources.

In 1964, a small group of Soil Conservation Service conservationists arrived under terms of a Participating Agency Service Agreement with the Agency for International Agricultural Development to help the Tunisian people develop a plan for soil and water conservation in the valley.

The valley receives an average annual rainfall ranging from 19 inches in the upper reaches to 8 inches in the lower. At present the only resource is agriculture. A better life for all is possible only through sound soil and water management. The job of accomplishing this was tackled by the conservationists.

An overall plan for land and water management for the Marguellil River Valley that entailed a series of flood-prevention reservoirs supported by needed land use and treatment measures was soon prepared. At the downstream point of the upper subwatershed, a key structure in the series was planned.

Other conservation practices for the upper subwatershed included: Constructing 180 miles of broad-base terraces and 25 miles of di-



A crew of Tunisian laborers constructs a rock road crossing. At this point a waterway crosses the farm road. All work is done by hand labor.

versions, 12 farm ponds, 35 miles of barbed wire fence to enclose selected pastures for grazing management demonstration purposes; 12 rock crossings where waterways cross farm roads; shaping and establishing to permanent sod 260 acres of waterways for terrace outlets; digging four wells; developing three springs; seeding 2,800 acres to pasture; planting 860 acres to fruit orchards and 1,800 acres to forest trees; deferring grazing and practicing range management on 10,000 acres of rangeland; stopping grazing for 5 years on 23,000 acres of rough land to receive special treatment for watershed protection and sediment control; and building or relocating 12 miles of farm roads.

By the end of 1966, more than

half of the planned measures on cropland, orchard, pasture, and woodland had been applied. One 600-acre field had been planted to perennial pasture grasses and enclosed by a 5-wire fence, something new in an area where grazing had been controlled by shepherds since before the time of Abraham.

Basic cropland practices, such as conservation cropping system, crop residue use, and contour farming, along with deferred grazing on rangeland and the cessation of grazing on watershed protection land were started in 1967. Several years will be necessary to bring these measures to fruition.

The conservationists hope that La Kesra will see the results of proper use and treatment of its land. ♦

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April 1968

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WATER RESOURCE PLANNING

Watershed protection

Geology of damsites

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



Soil Conservation Service

U. S. Department of Agriculture



COVER: A floodwater-retarding structure in the Poteau River Watershed Project takes form as a self-loading scraper makes its round in a cloud of dust.

Results . . .

What does a river basin survey do for a community?

We have been hearing of SCS participation in these broad resource studies under Public Law 566 for 10 years or more. Some are coming to an end now, and a few of the reports are completed.

To see what the product is like and how it is used, we asked the River Basins people for a report on one of the completed surveys.

River Basin Conservationist Sheldon Boone's lead article (p. 195) reviews the character and content of the formal report on the Poteau River Basin in Oklahoma and Arkansas.

Information Specialist Claude Crowley visited towns in the basin to get the story of the local people involved and the impact of the study on community planning and action (p. 197).

State action: A State, too, can take the initiative in planning a total water-resource program through studies of its river basins. New York State Conservationist "Wally" Anderson joins with Commissioner Francis W. Montanari to tell (p. 199) how New York has organized to cover its entire area.

New type: A new printer brings us a new selection of typefaces for this issue. We hope the change gives our official magazine a more modern look in keeping with our advancing programs.

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It's comprehensive

It's cooperative

The Poteau River Basin Survey

By Sheldon G. Boone

Assistant director, River Basins Division, SCS

A comprehensive analysis of water and related land resources and the needs and potentials for their development give people of the Poteau River Basin of Oklahoma and Arkansas firm guidelines for future projects in the area.

About a year ago, the Soil Conservation Service delivered the formal report to the Poteau River Watershed Council of Soil and Water Conservation Districts. The survey was conducted in response to the request of the council, which for some 15 years has led efforts to deal with water problems in the basin.

The report was the product of 5 years of work in cooperation with the U.S. Army Corps of Engineers, other agencies of the Department of Agriculture, and State and local agencies concerned with water conservation and development. It recommends five major developments for the immediate future:

With the assistance of the Department of Agriculture—

(1) Soil conservation treatment of 346,000 acres of land, at an estimated cost of \$11.5 million. This treatment would involve 49,000 acres of cropland, 155,000 acres of pasture and range, 113,000 acres of forest and woodland, and 47,000 acres of wildlife, recreation, and nonagricultural land.

(2) Installation of watershed protection and flood-prevention projects (Public Law 566) on all tributary watersheds where such programs are feasible. In addition to the Poteau River and Fourche Maline Creek watersheds, already authorized when the survey started, five other upstream watersheds were found to be potentially feasible projects: Caston-Mountain Creek, Black Fork Creek, Combined Creek, James Fork Creek, and Brazil Creek. The total cost of the structural measures in these five watersheds is estimated at \$11.8

million. The proposed projects include 41 structure sites for flood prevention, some of which have potential for multiple-purpose storage.

By the Army Corps of Engineers—

(3) Modification of the Wister Reservoir to include 118,000 acre-feet of additional storage, primarily for water supply, water-quality control, and recreation at an estimated cost of \$1.6 million.

(4) Construction of a reservoir on Brazil Creek for flood control, water supply, and recreation at an estimated cost of \$13 million.

(5) Improvement of the Poteau River channel below the Wister Reservoir at a cost of \$9.5 million.

The investigation was one of 20 such studies undertaken by the Soil Conservation Service in cooperation with another Federal or State water agency under provisions of the Watershed Protection and Flood Prevention Act. Such cooperative comprehensive studies

are known as "type IV" studies in the program of basin-wide investigations that now involve more than 75 percent of the land area of the 48 mainland States (see *Soil Conservation*, December 1966).

The Poteau River Basin studies were initiated by the Army Corps of Engineers in response to resolutions of the Congress authorizing it to make investigations of improvements for flood control and allied purposes and for navigation.

As a result of early hearings, the Corps recognized the desire of local people for watershed improvements under Public Law 566 with assistance from the Soil Conservation Service. The Corps and SCS agreed that plans for water-resource development in the basin should be comprehensive and should be coordinated among the agencies involved.

At the start of the study in 1962, some progress in water and related land-resource development had already taken place. The Corps had constructed the Wister Reservoir at a cost of about \$10.5 million. The Fourche Maline Creek Watershed Project (Public Law 566), estimated to cost \$6 million, was under construction. Soon thereafter the Poteau River Watershed Project, at \$5.4 million, was approved.

Upon request of the Poteau River Watershed Council, the Department of Agriculture undertook the study to: (1) Consider the present and projected needs for erosion control, flood prevention, water management, fish and wildlife, and recreation; (2) evaluate the capabilities and potentials of meeting the water and related land-resource needs; and (3) to coordinate studies with those being made by the Army Corps of Engineers.

The Soil Conservation Service has leadership responsibility for USDA participation in river basin investigations. The Economic Research Service and Forest Service participate jointly and other USDA agencies—especially Farmers Home Administration and Rural Electrification Administration—make contributions when their interests are involved. The Poteau River study was carried out by a field advisory committee consisting of representatives of the Soil Conservation Service, Economic Research Service, and Forest Service, with SCS as chairman.

The Economic Research Service and the Forest Service evaluated the needs for water-resource development in relation to agricultural crops and forest resources. The Soil Conservation Service and

the Forest Service determined the need for land treatment and management practices.

The Army Corps of Engineers determined needs for water supply to meet municipal and industrial requirements and, with assistance from the Public Health Service, for water-quality control.

Data on streamflow, recreation needs, and fish and wildlife values were obtained from the Department of the Interior. The SCS and Corps shared the responsibility for determining the magnitude of the flooding problems. Generally SCS determined flood damages in upstream watershed areas and the Corps in downstream and urban areas. The Corps made studies on the need and opportunity for navigation.

Findings of needs for development were coordinated with appropriate State and local organizations, and potentially feasible projects were identified jointly among the agencies.

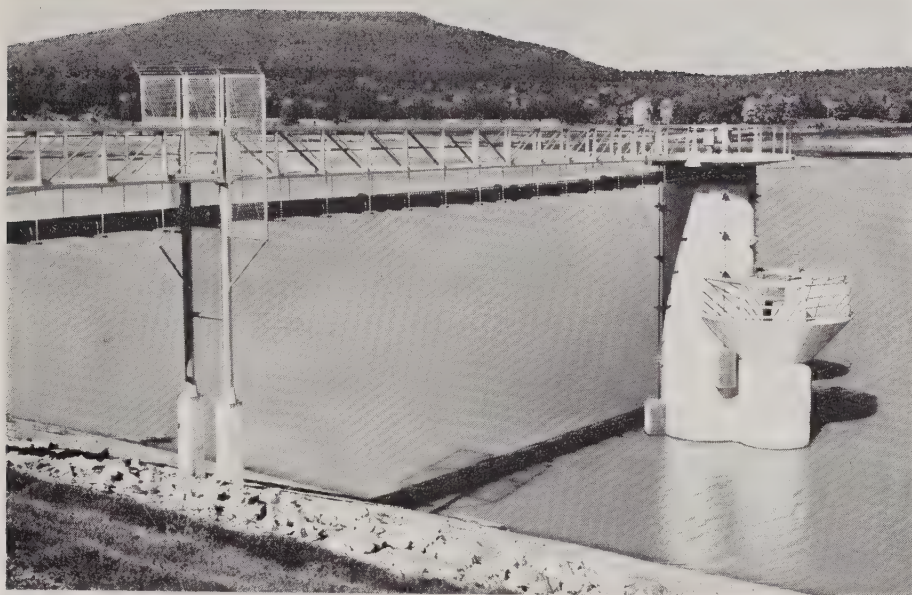
SCS with the assistance of the Forest Service studied each of the upstream watersheds to determine what potential existed for Public Law 566 projects to help meet the needs and to consider possible developments by other agencies. These studies identified projects that would be needed during the next 10 to 15 years.

Of eight upstream watersheds studied, five were determined to be potentially feasible as Public Law 566 projects, and the other three contained measures that could be developed by other means. The Corps studied the opportunities for project development on the main stem and larger tributaries.

The coordinated report shows only what water developments are needed and feasible. The securing of approval for watershed work plans and authorization of flood-control projects are still ahead. The council and the other responsible State and local organizations still have plenty to do to make their dreams become a reality. ♦

Poteau River Basin.





This multipurpose reservoir in the Poteau River Watershed Project brought a crucial water supply to Waldron, Ark., in time to rescue the town's major industry. The picture shows the inlet tower and spillway.

Pioneering the Poteau

Members of the Poteau River Watershed Council would never describe themselves as pioneers, but that is exactly what they are.

They organized a river basin council when Public Law 566 was still a dream. They had no guidelines, no treasury, and no authority, but they made it work. The council brought into focus many of the goals of 44,000 people living in western Arkansas and eastern Oklahoma.

A new confidence

Their coordinated approach to conservation problems has already heartened the economy and promises a vigorous resource development program in the near future. Multiple-purpose dams are already supplying water to industries and homes in two thirsty communities. Floods have been reduced on three operational watersheds, and residents of the rural communities have a new confidence in their area.

"The main thing that inspired us to organize back in 1953 was flooding," Council President John E. Evans said. Evans, a rancher,

and pastor of a 50-member Baptist Church near Waldron, Ark., has headed the council throughout its 15-year life.

Evans' ranch home was isolated by high water three or four times a year. Landowners along the creek frequently lost livestock in the fast-rising floodwaters. Sediment from steep mountainous areas with insufficient cover, and from burned-over pastures and woodlands, filled channels and covered more fertile land. In parts of the flood plain, good soil was lost by scour erosion.

"John Kopf, one of our local soil conservation district supervisors, conceived the idea of a council for the entire basin," Evans said. "At one of our regular board meetings, John proposed that we get together with other Poteau basin soil conservation districts to do something about upstream floods."

Districts of two States

A map shows the 1,888-square-mile Poteau Basin hanging from its mouth on the Arkansas River in the form of a rough triangle. The stateline divides it with about one-third in Arkansas and two-thirds

in Oklahoma. The largest town, Poteau, is located near the geographic center of the basin.

The triangle is made up of scenic mountain country reminiscent of the Blue Ridge range of the East. The mountains, some of them reaching to more than 2,000 feet elevation, slope down into scenic, narrow valleys. Expanses of forest cover about 70 percent of the basin. Most of the cropland is on the main stem and tributary flood plains.

Arrangements were made to meet with the other four soil conservation districts in the basin on July 28, 1953. The Poteau River Watershed Council was born that day.

The council is made up of supervisors from the Poteau River and the Sebastian County soil and water conservation districts in Arkansas and the LeFlore County, Haskell County, and Latimer County districts in Oklahoma.

Dr Lloyd E. Church at Wilburton was elected vice president of the council, and Terry Chaffin of Poteau was elected secretary and



The down-to-earth annual meetings of the Poteau River Watershed Council help keep up the enthusiasm of the 15-year-old organization.

treasurer. Church, a well known conservationist-dentist, had recently moved to the community, bringing with him several years' experience as a soil conservation district supervisor and dedicated booster of the Washita River Watershed Flood Prevention Program.

Chaffin, a retired teacher who operates a 420-acre livestock farm, has been chairman of the LeFlore Soil and Water Conservation District for two decades.

Then Public Law 566

The Poteau River Watershed Council was elated with the passage of Public Law 566, only a year after the council's organization.

By 1961, two key watersheds were authorized for operations with Public Law 566 assistance. Under the urging of the Poteau Council, watershed projects were hatching out on the streams above Wister Lake, which the U.S. Army Corps of Engineers had built on the main stem in 1948. But, in spite of the progress made, there was still no coordinated plan or source of information. The council kept working with the Corps and the Department of Agriculture to obtain an overall study of the basin.

In 1962 the study was set in motion. The State conservationist of Oklahoma was designated as chairman of a field advisory committee to direct and review the work of USDA agencies and to coordinate with the Army Corps of Engineers. The Forest Service and Economic Research Service each appointed a member to the committee. Geologists, engineers, and economists were soon consulting with the council and the various watershed sponsors about ways to protect and develop the basin's resources.

A report was completed by the cooperating agencies in 1966. The study revealed that average annual flood, erosion, and flood-plain scour damages and nonfarm damages add up to more than \$1.3 million. Feasible structural measures suggested by the study will reduce annual damages by an estimated 83 percent. Land-treatment measures will further reduce the figure by an estimated 4 to 5 percent.

Members of the Poteau River Watershed Council realize that the big job is still ahead, but accomplishments have shown them the value of their pioneering organization.

Three watershed projects, representing a sizable portion of the Poteau drainage area, were author-

ized for operation by the time the survey was underway. A third has been authorized recently.

Multipurpose reservoirs

The towns of Waldron, Ark., and Wilburton, Okla., are already getting their municipal water from watershed lakes. Other multiple-purpose watershed reservoirs under construction will provide fish and wildlife benefits, recreation, and water storage for future use.

Waldron's major industry, employing 375 people, was so short of water the management considered moving. The reservoir brought ample water—750,000 gallons a day—to the industry and assured that the jobs and \$20,000 a week payroll would stay.

Wilburton had to put strict controls on water use in dry periods. Fire was a frightening thought when the town tank was nearly dry and little water was coming in. With the new reservoir the town has plenty of water, and several miles of rural lines have been developed to serve out-of-town subscribers.

Dr. Church takes visitors to Wilburton to the 95-acre multiple-purpose reservoir being built in Robber's Cave State Park. The Oklahoma Planning and Resources Board and the Oklahoma Wildlife Conservation Department are sharing the cost of the structure, which they say will be an outstanding feature of the popular family park.

If the measures recommended by the coordinated study are carried out, such accomplishments will be but a minor portion of the benefits enjoyed by the people of the basin.

With plenty of high-quality water, freedom from flood and related damage, and a location strategic to trade centers and transportation, almost unequaled for beautiful mountain scenery, the Watershed Council envisions a period of unprecedented growth for the Poteau Basin. ♦

New York plans for water

Regional resource development boards bring agencies together in studies of river basins

By Francis W. Montanari and Wallace L. Anderson

Assistant commissioner for water resources, New York State Conservation Department, Albany, and State conservationist, SCS, Syracuse, N.Y.

New Yorkers, pressed by the drought years of 1962-66, are taking a searching look at their river basins and organizing forces to plan the development of their extensive water resources.

In 1959, the Temporary State Commission on Water Resources Planning reported, "The most productive approach to the State's water-resource problems can be accomplished through State-Federal cooperation. . . ." Now, Federal and State agencies are cooperating on river basin studies covering almost the entire State.

The State Water Resources Commission represents State interests by including members from State Departments of Conservation, Transportation, Agriculture and

Markets, Health, Commerce, Law, and the Office for Local Government. The Division of Water Resources is the commission's technical service arm in river basin studies.

The U.S. Department of Agriculture participates in river basin studies through the Soil Conservation Service with the cooperation of the Economic Research Service, Forest Service, and other agencies as appropriate.

Studies in progress

Two studies, one on the Genesee River Basin and one on the Susquehanna River Basin, will result in recommendations for the construction of water-resource projects. Also underway are a North

Atlantic Regional Study and an Ohio River Basin Study, which will result in framework plans for these two streams.

A Western New York River Basins Study, now in the beginning stage, will identify specific projects in its recommendations. Under a cooperative agreement with the Soil Conservation Service, the New York State Division of Water Resources will reimburse SCS \$44,000 in order to accelerate the studies to meet schedules for a completed comprehensive water-resource plan established by the division. The money will be used to make upstream reservoir site inventories and cost estimates and to do field surveys of flood and drainage problems.

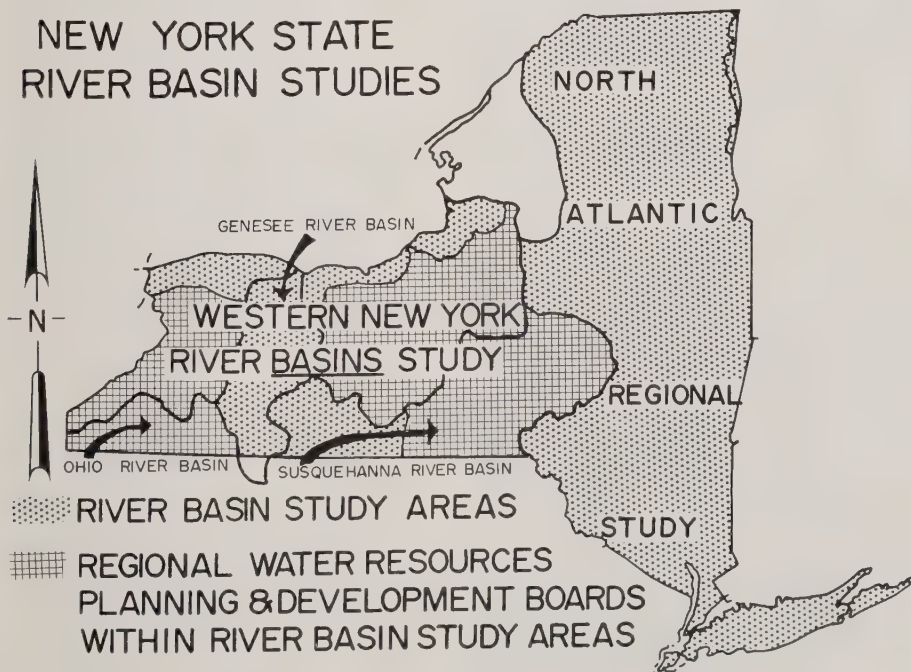
Other studies are being conducted jointly by interstate or Federal-State commissions or committees in the Delaware River Basin, the Great Lakes Basin, the New England River Basins, and as part of the Appalachian Regional Development Program.

Role of conservation districts

The State recognizes the importance of soil and water conservation districts as a means of including local people in resource planning. In turn, the districts encourage county governments to request the State Water Resources Commission to form regional water-resources planning and development boards. Six such boards, representing 24 of the 62 counties in the State, have been organized since 1960.

A regional water-resources planning and development board formulates a comprehensive plan which identifies projects economically justified for development and outlines possible means of financing and managing them. The board uses basin studies as a guide for applying plans suggested by the U.S. Army Corps of Engineers and the U.S. Department of Agriculture.

The Board's personnel and its



Channel improvement projects (right) are recommended in river basin reports for flood control, drainage, and streambank stabilization.



legal, engineering, and other services come from the commission, through the Division of Water Resources of the State Conservation Department. The counties involved pay 25 percent of the cost of the study, and the State pays the balance.

A variety of interests

Five of the seven board members represent a specific interest, such as agriculture, industry, public water supply, municipal corporations, and outdoor recreation, and two are members-at-large.

For example, on the Erie-Niagara Basin Board in western New York, agriculture is represented by Wendell Call, a town supervisor and vice-chairman of the Genesee County Soil and Water Conserva-

tion District. Many dedicated men, like Mr. Call, are investing much time and energy toward insuring wise use of the State's water resources.

Soil and water conservation districts and regional water-resource planning and development boards complement each other. Districts give information and support to the boards and help insure the proper consideration of agricultural interests in the final plans. As an example, seven districts in the South Central Resource Conservation and Development Project recently helped supply the petition

for establishing the Eastern Susquehanna Regional Planning Board. This board is now established.

Local governments and State and Federal agencies are anxious to convert these plans to action. The result will be construction of reservoirs for flood control, municipal water supply, pollution control, irrigation, and recreation; the identification of areas best suited for agriculture, highways, and parks; the enlargement or stabilization of channels for flood control, navigation, drainage, or sediment reduction; and the proper use and management of land to reduce erosion and floods and to insure proper use of land resources. The plan also will point out the needs for new State and possibly Federal legislation for action programs.

Although anxious for action programs to begin, New Yorkers are convinced that adequate and proper planning is necessary to ensure the most economical and wise use of each dollar spent. ♦



Comprehensive river basin plans (left) also appraise present and future irrigation needs. Irrigation projects can then be planned to meet these needs.

Mennonites put stewardship to work to halt floods in Kansas watershed

The moment of truth—it came suddenly to the congregation of the Tabor Mennonite Church—a congregation of families with deep roots in the soil of the Newton, Kans., countryside. Christian soil stewardship, as they had been practicing it, was based more on feelings than on facts.

The facts were that their land, a rich heritage from 19th century immigrant farmers, was showing the strain of modern farming pressures. Soil that had provided food, feed, and fiber for three generations of Mennonites was leaving the fields with each heavy summer storm. Erosion scars were appearing on knolls and steeper slopes. And love for the land, though ingrained and sincere, wasn't enough to prevent widespread destruction.

The moment of truth for most of the menfolk of the Tabor Parish came during a meeting held at the church on the night of January 10, 1966—the outgrowth of a disastrous flood that hit the town of Newton on June 9, 1965.

The Newton flood

The meeting was arranged by the Rev. James Waltner and officials of the church following a discussion with Marvin Hostetler, Kansas State chairman of the Mennonite Disaster Service. But the truth, in stark clarity, came out several months earlier while the flood-plagued town of Newton was fighting its way out of the avalanche of water, mud, and debris dumped upon it from surrounding rain soaked farms.

All of Harvey County had been experiencing rainy weather jitters for more than a week. Sand Creek was reported higher than during a 1960 flood that caused widespread damage.

Then, on June 9, came the flood that Newton residents will never forget. Residential sections were inundated. Waters surged into basements and living rooms. Refugees made their way out of isolated buildings on foot or waited for boats to come to their rescue. The old and the crippled found the situation doubly difficult.

Into this setting and the days of cleanup that followed came the American Red Cross, the Salvation Army, the National Guard, State government officials, special police, local church groups, and the Mennonite Disaster Service.

The Mennonite Disaster Service is a volunteer person-to-person type of organization that began in nearby Hesston in 1950 and has since spread throughout the United States. A contact man in every Mennonite church congregation has a list of volunteers, including

nurses, and a list of available tools and rescue equipment. In Kansas, about 85 congregations can respond immediately to the cry of alarm that follows a major flood, fire, tornado, or earthquake. In the Newton disaster, 600 volunteers responded, bringing their own handtools with them.

Where does it come from?

At the height of Newton's relief and cleanup operations, MDS Director Hostetler drove to the office of Bert Green, SCS soil conservationist assisting the Harvey County Soil Conservation District.

"Bert, where in the world is all this water and mud coming from?" Hostetler asked.

Green explained that all the water that poured down on Newton came from land in the upper part of the 65,000-acre Sand Creek watershed in Harvey and Marion counties. The mud that covered floors, rugs, furniture, and parking lots was mainly topsoil from the farms of the upper part of the watershed—farms operated chiefly by the same Mennonite men and boys who at that very moment

Volunteers help evacuate residents of Newton during the flood of 1965.



were helping to scoop the mud out of flooded Newton homes.

So that's the way it came—the moment of truth. That is what sparked the buildup of conservation interest and a meeting at the Tabor Church several months later.

"I had a slide talk already prepared on soil and water conservation," said Hostetler, a leading conservationist in his own community. "I had been using it with the folks in the Monitor watershed up in McPherson County. We had managed to get 80 percent of the needed conservation treatment on the land there and it gave us hopes we might do as well down here."

In addition to the Tabor men, members of the congregation of the nearby Alexanderwahl and the Goessel Mennonite churches came to see and hear the presentation.

The church meeting is now history, but it lives in the memory of those who came. Galen Rudiger, Newton, secretary-treasurer of MDS, says, "We've sown a lot of seed for thought. It will sprout and grow."

The young Reverend Waltner, who sees that Soil Stewardship Sun-

day is annually observed in the church program, says, "I look on this as a very crucial meeting in changing attitudes toward soil and water conservation. It was an opportunity for the congregation to see the direct connection between the need for conservation and the flood damage in Newton. The climate has changed so that men can talk with one another about the need for conservation without appearing to threaten their independence. Several men signed up for soil conservation district cooperation last year who hadn't got around to it before."

Conservationist Bert Green can vouch that there has been a great increase in district agreements and conservation work in the watershed above Newton since the 1965 flood. He estimates that more than 20 percent of the needed land treatment has now been accomplished, with up to 30 percent in some of the crucial areas.

Even before the flood, there were some outstanding conservationists in the close-knit Mennonite community. Much of their work was done in an independent fashion using their own equipment.

Bill Voth, a conservation farmer, has the respect and admiration of his neighbors. Ernest Goertz had built 2½ miles of terraces with his own tractor and dozer blade. He is highly pleased with the way he eliminated ditches, nearly stopped erosion, and increased his income. He points out that he still has more conservation work to do.

To appreciate the progress that is now being made and the real courage it has taken to adopt modern conservation methods, it is necessary to know something of the Mennonites' history and background.

Independence and cooperation

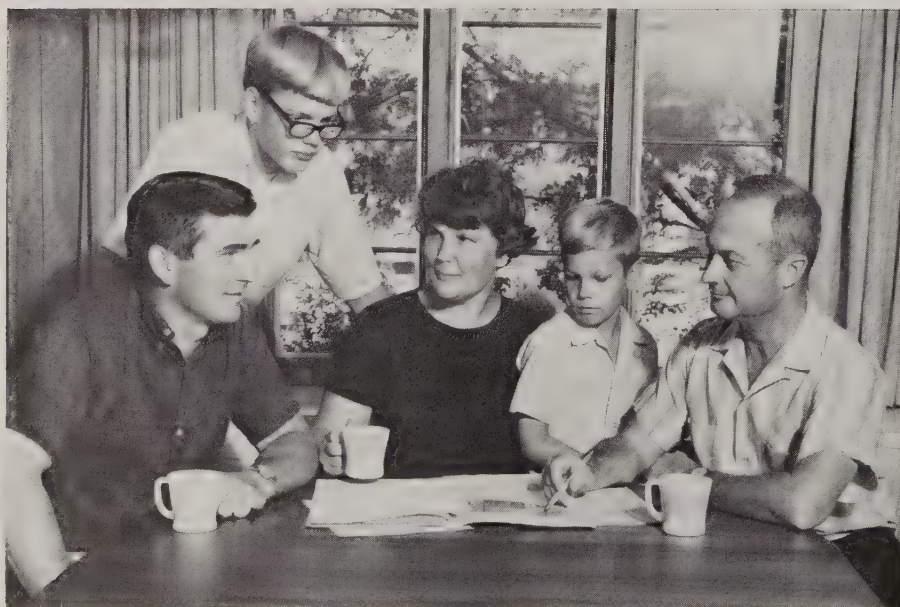
Beginning about 1874, hundreds of Mennonite immigrants settled in central Kansas. They came to America from Russia and brought with them a hard winter wheat that has since helped to make Kansas the breadbasket of the world.

According to Reverend Waltner, the Harvey County settlers established a village pattern. The families were large and customs of inheritance divided the land into many small tracts. Soil and water problems don't respect farm boundaries, however, so decisions on water management require agreement of several landowners before anything can be done. Traditional independence of thought and action, while admirable in most circumstances, had slowed the conservation progress needed to compensate for changes in the use of land.

No one is expecting miracles. Any conservation effort takes time, money, and patience. But persistence is one trait that has never been found wanting in the Mennonites.

In the long run, Sand Creek watershed district leaders now hope to get sufficient control of the waters that fall within the watershed to avoid severe flooding except in the exceptional storm that might be expected once in 100 years. ♦

The Bill Voth family was one of the early conservation farmers of the Sand Creek watershed. Soil Conservationist Bert Green (right) discusses their conservation plan with Mr. and Mrs. Voth and their two sons, Myron (left) and Warren.



Drainage improvements extend a school playground

By Frederick T. Mott

Work unit conservationist, SCS, Dover, Del.

How do you extend a school playground over a ditch that passes through a highway culvert and drains five other properties? Federal, State, and local cooperation made a little problem out of a big one for Hartly, Del., population 200.

The public school had been enlarged, and the only space available for more playground area was a poorly drained field. Through this now important section of school property ran the shallow ditch in question. It was a drainage outlet for over half of the 75-acre Erich Lasch farm.

The same ditch passed between house lots, went under a busy public highway, and continued through two more farms.

Until the time of the school expansion, everyone's drainage was satisfactory. The expansion program was about to change all that. That school could not permit an open ditch to run across the playground. Lasch and the other landowners could not afford to have the outlet ditch filled. If an underground pipe were used, the culvert under the highway was too high to take the water.

Most of the landowners involved, as well as some of the school board members, were cooperators of the Kent Soil and Water Conservation District.

Edgar Harmon, a local merchant and chairman of the school building committee, led the people in working together on the problem. The Soil Conservation Service made preliminary investigations, gathered data, and developed a water-control plan.

The plan included an outlet for the Lasch farm, 448 feet of 24-inch diameter pipe under the school playground and house lots, two drop inlets to take the water off



Hartly school children enjoy their enlarged playground.

the playground, and another to drain the house lots.

It also called for grading an acre of land, building one drop inlet for highway and village drainage water, enlarging and lowering 78 feet of culvert under the public road, and an additional 3,000 feet of ditch below the highway to improve the outlet through the farms downstream.

The local people approved the plan and made financial arrangements to complete it. The school board put out invitations to bid. The supervisors of the conservation district requested the Delaware Soil and Water Conservation Commission to lower the highway culvert according to the plan. In Delaware, the State Soil and Water Conservation Commission has special authority, funds, and equipment to replace highway culverts or bridges involved with a drainage ditch designed by the Soil Conservation Service. This construction is done as a public service

without cost to the properties involved.

Upon receiving the group's permission to begin construction, the district supervisors provided the coordination needed to get the job done. They provided Soil Conservation Service technical services to stake out the job, set grades, and check construction. They also provided their heavy earthmoving equipment for the construction of the outlet ditch. The Soil and Water Conservation Commission did the culvert work under the highway. A local contractor laid the pipe under the playground and house lots and built the required drop inlet structures, including the outlet for the Lasch farm.

Today, the scars of construction have healed and all who took part are satisfied with the results. The surrounding area looks better than it did. All properties are most useful and valuable. The school is enlarged and the playground is excellent. ♦

The plan holds water, but will the dam? . . .

Geologic studies help assure safe watershed structures

By Gunnar Brune

Engineering geologist, Engineering and Watershed Planning Unit, SCS, Fort Worth, Tex.

Building the large dams in watershed projects requires a more thorough site investigation and more exacting design than the numerous small ponds that were a major part of SCS engineering work a few years ago.

Some of the multipurpose structures in watershed projects are more than a hundred feet high and may impound up to 25,000 acre-feet of water. Such structures are too costly to be undertaken without assurance that they will function properly. More important, the failure of such a large dam might endanger lives and certainly would cause severe damage to property.

Detailed exploration of subsurface geology is a necessary part of site investigation for large dams. A few shallow borings with a hand auger usually provided sufficient information for the design of farm ponds, but deep borings with power machinery and sophisticated testing of rock and soil are required for the larger structures.

The Soil Conservation Service uses professional geologists, skilled field crews, and laboratory facilities to determine the nature of foundation materials, the types and amounts of soil and rock material available for construction, whether rock excavation is required, and to answer other problems relating to each damsite.

An SCS drilling party normally consists of two geologists, two drillers, and three helpers. Each party usually has a large core drill rig capable of taking rock cores or undisturbed soil samples, a power

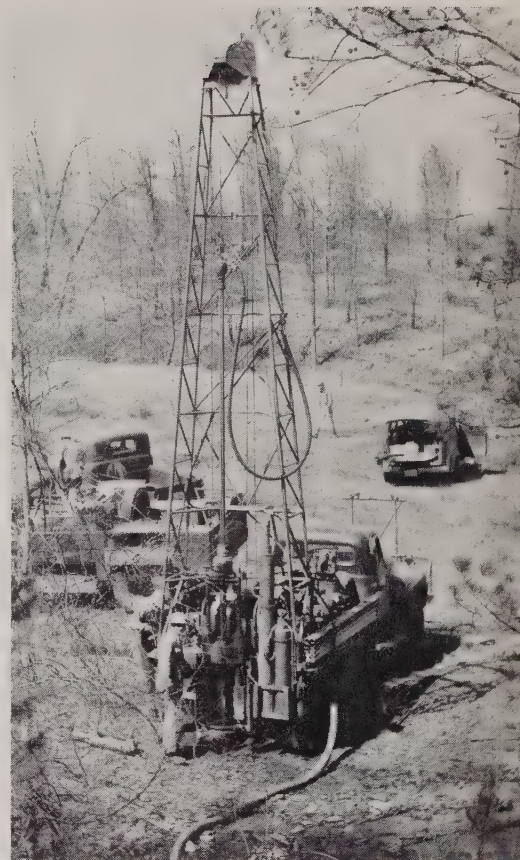
auger to investigate potential borrow areas, a water truck to supply water for coring operations, a mobile field office or trailer, and other vehicles. In those States that have little geologic exploration to do, a private contractor usually is hired to do the drilling.

After the geologic data on a site have been gathered, the geologist must prepare a report of his findings. His work may indicate that montmorillonitic clays, subject to serious swell-shrink tendencies, are present. He may find different thicknesses of compressible material or an uneven rock profile that might cause differential settlement of a dam. The availability of various types of soil and rock material must be described in the geologist's report.

Some types of rock in a foundation can cause serious problems. Anhydrite, for example, can explode violently when water is impounded over it.

Caverns in the proposed foundation site must be outlined, for they could cause a structure to leak or collapse. Faults, where geologic formations have cracked and moved in relation to one another, must be studied, for they might result in serious leakage or settlement problems after a structure is built. A thorough evaluation of potential slide areas must be given in the final report.

To obtain the necessary geologic information, drilling may be supplemented or supplanted by trenches dug with a bulldozer, especially in bouldery or cobbly soils.



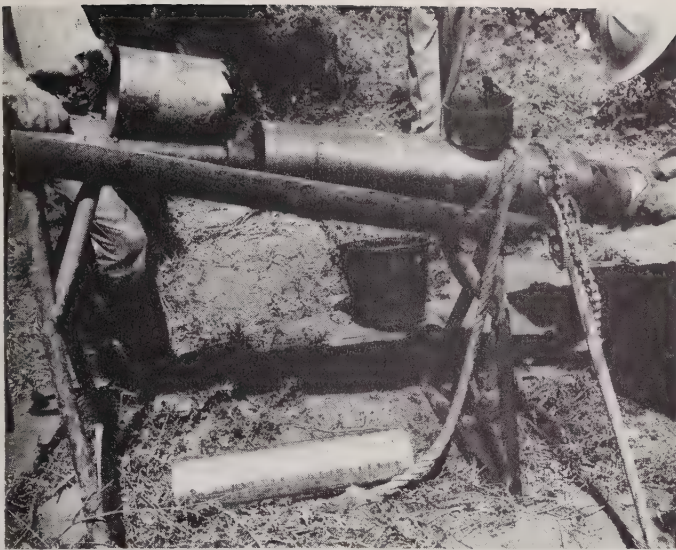
An SCS drilling party (above) sets up a core drilling rig on the centerline of a proposed damsite. Much of the work on most sites is done with a simple earth auger, with the geologist describing and logging the materials as they are removed from the hole. Disturbed samples are taken for testing in the laboratory.

Many special geologic tests are made in the field. A seismograph may be used to determine the depth to bedrock. A resistivity meter uses electricity to give information about underground formations and the water table.

Where it is impossible to obtain an undisturbed soil sample, the field party may use special equipment to determine the in-place density of materials.

Vane shear test equipment is used to measure the in-place shear strength of soils. The results of such tests are especially valuable for "sensitive" clays that are difficult to sample in an undisturbed condition for laboratory tests.

A Wheatstone bridge, an electrical device, may be used to tell whether there is a dangerous



For some types of tests, such as consolidation potential, undisturbed soil samples are required. The most common method of obtaining these is with a double-tube sampler (above, left). The outer tube of this device rotates and cuts away the soil with a toothed bit while the inner tube is forced down over the sample without turning. A drilling fluid carries the cuttings out of the space between the two tubes and to the surface. In dry soils, the addition of water would destroy the structure of the soil, so air is used to blow the cuttings to the surface. Penetration tests are made with a special type of sampler (above, right) and a standard drive weight that is dropped a standard distance. The number of blows required to drive the sampler 1 foot provides information on the strength of the foundation. Permeability tests are made in the field with a permeameter (below). This apparatus measures the rate of movement of water through various subsurface strata. The equipment can be used to simulate the head of water that will exist when the proposed structure is built and thus indicate whether serious leakage would occur.

Cores of rock often are needed for inspection or testing. Steel bits surfaced with hard alloys or industrial diamonds are used to obtain such cores, which can then be laid out in sequence and described.



amount of gypsum in the foundation or in the materials to be used to build a dam.

Piezometers may be installed to measure ground-water pressure and aid in studying ground-water flow. Ground-water samples are tested where it is suspected that the water may cause corrosion or incrustation of concrete and steel structures.

Geologic exploration is needed for channel improvement projects

as well as for dams. The presence of rock, weak caving materials, or very permeable soils in proposed channels, must be detected and avoided if possible.

Basic information on these and many other geologic phenomena that may have a bearing on the design of a dam or other structure is then presented in a form useful to design, construction, and soil mechanics personnel. ♦

Watershed project keeps Texas town safe from Hurricane Beulah's floodwaters

Hurricane Beulah in September 1967 proved to the people of Bishop, Tex., that upstream watershed projects really work.

While most south Texas cities fought floodwaters for days during and after the hurricane, Bishop escaped with only a few hours of light flooding, thanks to a 3½-mile levee and channel flood-prevention system installed as part of the Chiltipin-San Fernando Creek Watershed Project.

Flooding occurred only twice during the torrential rains associated with Beulah September 19–22, and then only for a few hours at a time. This was in contrast to previous storms when Bishop was hard hit by flooding.

In 1958, most of the town was under water for 3 days. In 1967, water overtopped the levee twice, covering only the western section of town for 6 hours one time and 9 hours the other. Residents and businesses in the eastern part of the city, however, were high and dry throughout the storm.

Bishop Mayor J. H. West praised the watershed project, saying that Bishop would have been washed away had it not been for the levee and channel system. He estimated that the project saved at least \$500,000 in damages to the city.

West also said flooding in other

sections of south Texas was worse than in 1926, the previous record flood. He said that the city of Bishop got back more than the cost of the project through this one test. This is considered the first major test since the project's completion.

Rains following Beulah exceeded what might be expected on the average once in 100 years. Before the storm hit, Bishop had already had 14 inches of rain, and the soil was so soaked that it couldn't hold any more water. Some areas in the watershed had 22 inches during the storm—almost equal the 25 inches that is normal for a year. In addition high winds retarded runoff until the storm passed, causing more water to come downstream at one time. The result was more water than the protective system was designed to handle.

Interest in the watershed project started in 1954 following floods in 1951 and 1953. A watershed association was formed to help the Nueces-Jim Wells-Kleberg and Aqua Poquita soil and water conservation districts get the project underway.

Under the leadership of John Young, then Nueces County judge and now a Congressman, local interests raised \$90,000 to pay for planning the project. Nueces County raised 50 percent of the

funds, Jim Wells County 30 percent, and Duval County 20 percent, a ratio based on estimates of benefits from the project and used also in computing right-of-way and maintenance costs.

In addition to the 3.5-mile levee and channel project protecting Bishop, the Chiltipin-San Fernando Creek Project calls for 11 flood-retarding dams, 20.35 miles of channel improvement, and 5.7 miles of levee designed to give flood protection to other downstream areas in the project.

Although some flooding did occur in Bishop, officials are pleased with the way the project worked and that the community escaped the high waters it otherwise would have had.—REUBEN A. FRANKENHAUSER, *soil conservationist, SCS, Robstown, Tex.* ♦

State governments increase funds for districts

State Government contributions to soil conservation district programs increased to \$24.9 million in fiscal year 1967 from \$21.1 million in 1966. All State governments appropriated or allocated funds to district programs in 1967. These contributions have almost doubled in the last 5 years.

In all, non-Federal contributions of funds and services to conservation districts are estimated to be \$81.5 million in 1967. This includes the contributions of State and local government and those of private individuals and organizations.

Contributions from local governments increased to \$26.9 million in 1967 from \$19.6 million in 1966. Contributions of local government have increased \$10 million since 1963.

Contributions from private individuals and organizations increased to \$29.6 million in 1967 from \$23.4 million in 1966. ♦

Conservation aids in conversion to golf course

Mr. and Mrs. David E. Maxson had reached the point of decision. They couldn't continue operating their dairy farm any longer.

Income was too marginal in a highly competitive area. Their family farm of 70 acres and 30 cows was just too small. Expansion was out of the question, for owners of adjoining land had no intention of selling, even at \$1,000 an acre for uncleared acreage. This was premium land, being only a 5-minute drive from Amherst, famous college and university town in Massachusetts.

The Maxsons were unwilling to give up the place they loved. So they turned the farm into a 9-hole, 37-par golf course.

They sold their cows and went to work on the changeover. It took a lot of toil converting to golf. But finally they opened their Cherry Hill Golf Course on August 13, 1965. Their biggest single day during the rest of the short 1965 season saw 130 golfers at play over the rolling course. Their biggest weekend brought out 200 players.

When Maxson began the conversion, he found that the conservation program he had applied to his farm served the needs of the golf course well.

His conservation farm plan included irrigation, four ponds, drainage, grassed waterways, and crop and pasture rotation. He fertilized and limed the land as soil tests dictated. As a cooperator with the Hampshire Conservation District, he received technical help from the Soil Conservation Service in planning and applying his conservation program.

Now one of the farm ponds supplies all the water needed for keeping the fairways and greens of the golf course in top condition. The ponds also serve as golfing hazards.

The \$3,000 he invested in the conservation work on his farm mul-



Owner David E. Maxson watches as friend and neighbor Ralph Hobart gets ready to tee off at the first hole of the newly constructed Cherry Hill Golf Course.

tiplied in value when he converted the dairy to a golf course, he said. But changing the use of the land took a lot of additional money—\$100,000.

Maxson has remodeled a barn to house a lounge, restaurant, toilets, and shower and locker rooms. These facilities are on the ground floor, a few steps from the first tee and ninth green. The second floor houses a pro shop.

For patronage the Cherry Hill Golf Course draws on the people of Amherst and dozens of nearby towns, the faculty and students of the ever-expanding University of Massachusetts, and tourists who like to play golf wherever they happen to be. There's no other golf course for miles around, except one at Amherst College that is operated on a membership basis with non-members being permitted to play only when there is room to accommodate them.

Aside from a professional golfer who runs the pro shop and ar-

ranges for tournaments and other special events, the operation remains a family affair. Maxson takes care of the physical layout, keeping the course in first-class condition. Mrs. Maxson and the five children also help. ♦

Father and son make a conservation team

Conservation may not be an hereditary trait, but Randy Patefield, 17, and his father Warren, of Laurel, Nebr., prove it can be passed on from generation to generation.

Warren is the newly elected president of the Nebraska Association of Soil and Water Conservation Districts.

Randy is a 4-H'er who won 1967 State honors for his conservation efforts. He also won an expense paid trip to the 46th National 4-H Club Congress in Chicago, courtesy of John Deere, sponsor for the 4-H Conservation of Natural Resources program. ♦



Strip mine makes a recreation area

A 6½-acre lake created in a strip-mine pit is a center for pleasant living for the Bauemeister family. On one side of the lake are their cottage and boat dock, on the other a duck blind.



An attractive recreation area was what Roger Bauemeister had pictured when he bought 42 acres of strip-mined land in 1953. Only five areas had not been damaged by stripping and deposition of spoils.

Today, from the front porch of their cabin and boat dock, the Bauemeisters enjoy the beauty of their own 6½-acre lake in Callaway County, Mo. Rabbits thrive in the shrubs and grass that have been planted over the years.

As cooperators with the Callaway Soil and Water Conservation District, the Bauemeisters had the assistance of the Soil Conservation Service, the Forest Service, and the State Department of Conservation in the creation of an attractive recreation area. Trees and shrubs were furnished through the Agricultural Conservation Program.

Each spring since 1954, Mr. Bauemeister has planted evergreens until today they number

about 40,000. A multiflora rose fence, started from 11,000 seedlings, surrounds the entire area.

Two hundred fifty European black alders were planted in 1963. About 50 percent have survived and grown to heights of up to 18 feet. A few oaks have also been planted.

Lespedeza sericea, shrub lespedeza, switchgrass, and kudzu have responded well in most areas. Kudzu was first planted in 1963 to cover unsightly steep spoil banks. Results were excellent for bank stabilization but kudzu proved undesirable if used where it could get into trees or shrubs.

The lake, beside which the Bauemeisters built their cabin in 1956, was created by the last stripping operation. Bauemeister arranged for runoff water to drain into the lake, thereby diluting the acidity.

The Bauemeisters and many of their friends use the area for recreation, including hunting. ♦

Television features soil stewardship

“Top O’ the Morning,” Orion Samuelson’s television show brings the soil stewardship message to 35,000 Chicago-land viewers each May.

Samuelson, farm director of station WGN in Chicago, will highlight this year’s stewardship theme, “A Time for Initiative,” with five special conservation programs during Soil Stewardship Week, May 19–26.

Directors from three soil and water conservation districts in northeastern Illinois and from a district in Indiana will feature their conservation activities on four of these shows.

For the fifth, Mr. Samuelson plans to show colored slides of a dozen or more rural churches within WGN’s viewing area (which includes parts of Ill., Ind., Wis., and Mich.) and tell of the conservation practices used by members of each of these churches.

“I consider soil and water conservation the most important task in which rural and urban people need to cooperate,” said Samuelson. “As land is developed for new uses, it is imperative that the natural resources—particularly soil and water—of an area be considered. From the conservation activities we have highlighted on WGN, I have learned that soils information and interpretations are a very important tool in planning the wise use of land.”

During the 1967 Soil Stewardship Week, Emil Kubalek, Soil Conservation Service soil conservationist, Lake Zurich, and Harold Alvin, district director of the Lake County District, presented a program illustrating the conservation plan and practices applied on Burr Oak Nursery, a cooperator with the Lake County District. Alvin, who operates the nursery, installed terraces and waterways, and planted young trees on the contour.



Allan May, SCS work unit conservationist at Joliet, and William Stelter, district director of the Will-South Cook District, gave a program in 1967 that emphasized the role of private land owners in conservation of natural resources.

A third feature presented by Lawrence Benson, SCS work unit conservationist at Geneva, and Richard Kuhn, district director of Kane-DuPage District, discussed the role of the private land owner in providing recreation. Colored slides of small ponds installed in the Kane-DuPage District illustrated the fishing, swimming, ice skating, and picnic uses of the ponds and the adjacent areas.

In addition to its soil stewardship programs, WGN has also made much use of the color conservation scenes from the "America The Beautiful" series. The Lake County District presented a set of the 52 pictures to WGN several years ago. At that time Harold Turner showed all 52 pictures while he played organ music for a special WGN Thanksgiving program. Since then both Samuelson and Turner have frequently used the pictures on their programs.

Samuelson's future plans are to devote one "Top O' the Morning" program each month to soil and water conservation in addition to the soil stewardship programs.—**RICHARD DUESTERHAUS**, *work unit conservationist, SCS, Lake Zurich, Ill.* ♦

New electrification loans

More than 3,450 new consumers in Arizona, Colorado, Idaho, Missouri, Virginia, Texas, Montana, and West Virginia will benefit from loans recently approved by Rural Electrification Administration. Loans totaling \$10,533,000 will enable the borrowers to finance 341 miles distribution line, 153 miles transmission line, 11 substations, and other related facilities, to connect the consumers and to meet increasing electric power needs of people already being served. ♦

Cornell students study tropical soils



Luis H. Rivera, staff soil scientist, SCS, explains the classification and soil properties of a typical Ultisol on the Corozal Agricultural Experiment Substation.

A group of 30 students from Cornell University, most of them doing graduate work and with a major interest in tropical agriculture, visited Puerto Rico in January.

The trip was a joint effort of Cornell's International Agricultural Program and the University of Puerto Rico's Mayagüez Campus.

The group was interested in three main subjects: tropical crops, tropical animal science, and soils. Among the students were three girls, and also students from Africa, South Vietnam, Philippines, Canada, British Honduras, India, and Nicaragua.

Highlights of the trip were visits to several experiment stations and private farms to observe research and field operations in soil and water conservation practices, crops, grasses, and livestock. The students also visited a sugar mill to become

acquainted with its operation.

The Soil Conservation Service provided training to the soils group under the leadership of Staff Soil Scientist Luis H. Rivera. At each selected site, the classification, soil characteristics, and available laboratory data were discussed. A special effort was made to show the soils that are extensive in tropical areas, such as the Vertisols, Ultisols, and Oxisols.—**EMERITO MARTINEZ-RUIZ**, *SCS, Santurce, Puerto Rico.* ♦

RUSSIA'S CODE

Russia is preparing its first detailed national code to regulate water use throughout the USSR. Each Soviet republic and province is also drawing up a local code in which specific aspects of water use in different areas will be taken into account. ♦

Santiago Benitez is a pioneer. To visit with him on his farm is to gain appreciation and respect for the industrious efforts, the problems, and the aspirations of settlers in eastern Paraguay.

Benitez is tremendously proud of the 50-acre farm which he and his family are developing in this subtropical region. Pride is evident in his eagerness to show the results of his labors in clearing the forest and planting his fields. He is proud to display his recently acquired team of oxen and his new plow. And, he is proud of his role in the agricultural development of his country.

Benitez and his family are among the more than 35,000 families who have located in new farming areas during the past 6 years as part of the Paraguayan Government's effort to more fully develop the Nation's agricultural resources.

As conservation adviser

In Paraguay, as a soil conservation adviser during the summer of 1966, I had the privilege of working with Paraguayan officials and technicians of the Institute of Rural Welfare, the College of Agronomy, Extension Service, Agricultural Experiment Station, and others in helping these dedicated people search for practical solutions to their conservation problems. My work in Paraguay was sponsored jointly by the U.S. Department of Agriculture and the U.S. Agency for International Development.

Paraguay, compared with most other countries of the world, has much arable land in relation to its population. The climate and soils favor production of a variety of crops, and accelerated production is an important goal in Paraguay's economic development plans.

Torrential rains, erodible soils, clear-cutting of forests, and rapid losses of organic matter and soil fertility under clean cultivation contribute to the need for soil conservation in the new farming

Conservation pioneers in Paraguay

By Leon Kimberlin

Conservation agronomist, SCS, Phoenix, Ariz.

areas. The Institute of Rural Welfare, the agency of the Government of Paraguay administering the program, recognizes this need and is providing for conservation in its plans for agricultural development.

With machete and oxen

Agriculture in Paraguay is not highly mechanized. Of the 161,000 farm units reporting in the 1961 census, more than a third were using human energy for farm power. Only 1,221 tractors were reported. The remaining units used oxen or horses.

The new settler attacks the jungle-like forest with machete and ax. He fells trees and burns the brush and smaller logs to clear a patch of land for his home and for subsistence crops, which he plants and cultivates with a hoe.

After establishing crops for family food, he continues clearing land as rapidly as he can in order to extend his production beyond a subsistence level. In 3 to 4 years he can clear up to 10 acres of his 50-acre farm. At this point the labor of planting, cultivating, and controlling jungle regrowth on land already cleared prevents further expansion.

When he has reached this point, he may purchase a yoke of oxen and a plow, thereby diverting hand labor for clearing additional land. He has moved beyond the subsistence level of farming, and his farm unit is producing economically useful crops.

Conservation demonstrations

The Institute of Rural Welfare focused attention on soil conservation in the developing areas during 1966. The institute received the full cooperation of other Para-

guayan agencies, including the College of Agronomy, Extension Service, and the Agricultural Experiment Station, in training technicians, reviewing field problems, setting up demonstration areas, and developing policy and procedures for soil conservation activities.

Existing soil surveys were interpreted, and technical guidelines for land use and conservation treatment were prepared. Guidelines include land use and treatment alternatives applicable to the different levels of management and technology.

A short course in theory and practice of soil conservation was conducted for field technicians of the Institute of Rural Welfare and the Extension Service. The first of its kind in Paraguay, preparation for and conduct of this course drew the enthusiastic support of all agricultural agencies.

Four demonstration farms in different parts of the country were selected to represent the major conservation problems in each locality. A conservation plan was made with each of the farmers to put into effect a practical demonstration of the kinds of practices most applicable in the area.

Santiago Benitez seemed to voice the sentiments of his neighbors as he helped technicians lay out a soil conservation demonstration on his farm. "I want to live on this farm all my life," said Benitez, "I want it to be a good farm!" ♦

POND SEEPAGE

Excessive seepage in farm ponds is usually due to soils in the pond site that are too permeable to hold water. Thorough site investigation in the planning stage usually spots problem pond sites and allows landowners to avoid them. ♦

Garden Club Council talks of conservation

National Council of State Garden Clubs, Inc., will hold its 39th annual meeting in Biloxi, Miss., April 1-5.

The National Council, with a membership of more than 400,000 women, carries on an extensive program of activities through the several thousand local clubs affiliated with National Council as members of their State organizations.

For the convention theme, the council chose an old Spanish proverb, "More Grows in the Garden Than the Gardener Sows." The national president is Mrs. Charles O. Dean of Leland, Miss., who was a featured speaker at the annual NACD conference in Dallas, Tex., in February.

A symposium on conservation is planned for the program, and there will be reports of achievements in civic development, high school gardener projects, roadside development, and natural beauty projects, which are part of on-going programs in garden clubs throughout the country.

Dates and places

April 1-5, National Council of State Garden Clubs, Biloxi, Miss.

29-May 3, League of Women Voters, Chicago, Ill.

May

1-2, Southern Forestry Conference, Jacksonville, Fla.

4-9, American Society of Planning Officials, San Francisco, Calif.

13-17, Environmental Engineering Conference, Chattanooga, Tenn.

14-17, The Garden Club of America, Greenwich, Conn.

19-25, Soil Stewardship Week

26-29, National Watershed Congress, New Orleans, La.

26-30, Urban Land Institute, Atlanta, Ga.



John Williams (left) and SCS Soil Conservationist H. J. Hardy are pleased with the fish pond's contribution to farm income and recreation.

Diversification and new ideas improve land

By diversifying his operations, adopting new ideas, and carrying out a conservation plan, John Williams of Route 2, Salley, S. C., has improved his Aiken County farms.

Williams was one of the first cooperators with the old Edisto Soil Conservation District in 1939 and continued when the Aiken County Soil and Water Conservation District was formed in 1942, the same year that Howard J. Hardy joined SCS at Aiken.

Mr. Williams gave Hardy credit for helping him revise his first conservation farm plan. In carrying out the plan, Williams converted cotton and corn land to pastures. He built parallel terraces and grassed waterways. He stripcropped and planted and culled hardwoods. He built a 3-acre pond, stocking it with bass, bream, and catfish. People came from miles around to fish for \$1 a day.

"That extra income from the fish

pond helped," said Williams. "Besides, the pond provides water for my cattle." He will soon build another fish pond.

"Wind erosion used to be a real problem," said Williams. "The planting of multiflora rose and pine trees has about solved it, though."

Williams added to his original 97 acres by buying an adjoining 75 acres on which he developed pastures for Herefords and a few Jerseys. His herd of 18 head is now grazing on bermudagrass, bahiagrass, and sericea. He sold \$1,000 worth of cattle last year. He also grows cotton, corn, wheat, oats, soybeans, velvet beans, and rye.

In the early days with only a few mules, he and his family did the work by hand. Today, he operates combines, haybalers, and tractors on his two farms and 65 acres of rented land.—MURRAY WOOD, *RC&D project coordinator*, SCS, Walterboro, S. C. ♦

Review



Selected Papers in Soil Formation and Classification. EDITED BY J. V. DREW. 1967. *Soil Sci. Soc. Amer. Spec. Publ. 1.* Madison, Wis. 428 pp., illus.; paper. \$3.00.

This collection of papers on modern concepts in soil formation and classification should prove useful to soil scientists and others as a reference book. It brings together a wide range of material previously published in a variety of places. The editorial staff has done a good job of selecting important papers and grouping them under five broad headings.

The introductory section provides some general ideas on weathering, translocation, and the organic cycle in soil formation, and the possible relationships of these to environmental factors. The second section consists of 14 papers on characteristics of some genetic soil groups. A third section contains eight papers on soil forming factors, and the fourth deals with some important mechanisms and changes involved in soil genesis. The final section contains four papers on some modern concepts in soil classification.—LOUIS E. DERR, *Soil Survey Operations Division, SCS, Washington, D. C.*

The Wild Gardener in the Wild Landscape. BY WARREN G. KENFIELD. 1966. *Hafner Publishing Co., New York.* 232 pages, illus. \$7.50.

Early in this book the author identifies the audience that he is addressing: "This book is meant for those to whom fate or fortune—or misfortune—has given a tract of land of greater size than their lawn-mowing propensities can control."

He goes on to explain that the kind of land involved is usually abandoned fields growing up to a mass of vegetation, mostly impassable brush, blocking the view and

generally interfering with the landscape desires of the owner.

The solution that he offers is "naturalistic landscaping," manipulating plants and plant communities to form a pleasing whole. The methods he advocates are the application of herbicides with fertilizing, cutting, pulling, burning, and planting used to lesser degrees.

In three chapters the author provides detailed instructions for obtaining naturalistic landscaping. The first of these is concerned with eliminating plants; the second with maintaining the landscape; and the third with adding and aiding plants.

The principles as well as the methods of molding and managing vegetation stated in this book have applications beyond the requirements and esthetics of landscaping. Biologists, range conservationists, park planners, and others who wish to establish and maintain a particular plant community will find these ideas provocative and helpful.—LAWRENCE V. COMPTON, *head biologist, SCS, Washington, D. C.*

Man—An Endangered Species? BY U. S. DEPARTMENT OF THE INTERIOR. 1968. *U.S.D.I. Conservation Yearbook No. 4.* 100 pp., illus. \$1.50.

Continuing the format and the thesis of the lavishly illustrated Conservation Yearbooks begun in 1965, the Department of the Interior again presents its annual report of agency activities in the context of a crusade for conservation.

The brief introductory essay is an eloquent statement of the problem of environmental pollution and a plea for restraint in population growth and technological advancement. Otherwise, we are warned, man may join the ranks of the "endangered species"—if he has not already done so.

This is a restatement of the theme of "Quest for Quality," "The Third Wave," and "The Population Explosion," the titles of the preceding yearbooks.

Handsome color photographs, made possible through the loan of color separations of previously printed pictures in government and commercial publications, set an entrancing and appropriate background for the text.

The book is for sale by the Superintendent of Documents.—B.O.

Agricultural Development and Economic Growth. EDITED BY HERMAN M. SOUTHWORTH AND BRUCE M. JOHNSON. 1967. *Cornell University Press, Ithaca, N. Y.* 608 pp., map. \$12.00.

This book is intended primarily for students of the economics of agricultural development, both those in preparatory training and those more mature scholars who are already practitioners or interested in entering this challenging field. Although the book is written in the language of economics, its ideas are intelligible to interested readers not versed in the higher realms of economic theory.

The book is made up of a series of 14 chapters by well known authorities each followed by rather extensive comments by one or more commentators. Extensive citations and references are given at the end of each chapter.

An introductory chapter by the editors, entitled "Agricultural Development: Problems and Issues," sets the stage for the rest of the book by describing problems and issues and the role of the economist in agricultural development.

The 12 succeeding chapters contain a wealth of information and theories on a wide range of subjects. The final chapter by E. M. Ojala sets forth some ideas on how development should be planned and programed. Lacking, however, is any summary tying all of the papers together into some kind of conclusion or evaluation as to where we are, where we should be going, and how to get there in agricultural development.—JOSEPH B. ROGERS, *assistant for foreign programs, SCS, Washington, D. C.*

New publications

Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples. BY SOIL CONSERVATION SERVICE. 1967. *USDA Soil Survey Invest. Rpt. 1.* 50 pp., illus. \$0.35. This publication is the first of a new USDA series, Soil Survey Investigation Reports, established to make available technical information from cooperative laboratory and field investigations of soils of the United States, Puerto Rico, and the Virgin Islands.

This, the first number in the series, describes the various tests performed and procedures used in the soil survey laboratories. Succeeding numbers will publish the data obtained from samples from each State, tabulated by named kinds of soil. To date, 17 State reports have been published (N. Dak.; Iowa; Kans.; Nebr.; Ark.; Mont.; Wyo.; Minn.; Colo.; Okla.; Puerto Rico; Miss.; Ky.; Tenn.; N.C., S.C., and Ga. in one report; Wis.; Ind.).

A Method for Estimating Volume and Rate of Runoff in Small Watersheds. BY K. M. KENT. 1968. *USDA SCS-TP-149.* 19 pp., illus.

This technical paper presents a simplified method of estimating runoff in small watersheds that can be used by all grades of professional and subprofessional personnel of SCS work unit staffs who need to make quick, on-the-spot estimates for planning and designing conservation measures.

Charts are presented for estimating the instantaneous peak discharge expected from small areas. Each graph relates peak discharge to drainage area and rainfall depths for each of (1) a given set of watershed characteristics, (2) different rainfall time distributions, and (3) three categories of average watershed slopes.

The method is generally limited to drainage areas of 2,000 acres or less and to watersheds that have average slopes of less than 30 percent. The simplified method is compatible with the more complex procedures of the National Engineering Handbook which would be used on more difficult problems.

Aspirations and Expectations of the Rural Poor. BY WALTER L. SLOCUM. 1967. *USDA Agr. Econ. Rpt. 122.* 37 pp. One of several studies made to provide research approaches in different problem areas of rural poverty and economic development. This report was prepared by the author under contract authorized by the Economic Research Service but his opinions do not necessarily reflect the view of the agency nor USDA.

A Comparison of Age Levels of Farmers and Other Self-Employed Persons. BY RADOJE NIKOLITCH. 1967. *USDA Agr. Econ. Rpt. 126.* 13 pp., illus. Farming industry continues to expand its production, and farmers as a group are not get-

ting older than entrepreneurs in other industries.

Conservation and the Water Cycle. BY SOIL CONSERVATION SERVICE. 1967. *USDA Agr. Inf. Bull. 326.* 8-page folder, illus. \$0.10. The water cycle is an endless process of water circulation going on throughout the world. The colored diagram in the folder and the description of the hydrologic processes that affect the earth and its inhabitant trace the movement of water through the cycle. A 40- x 28-inch color reproduction of the diagram is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402 for \$0.35.

Sealing Leaking Ponds and Reservoirs. BY GEORGE RENFRO, JR. 1968. *USDA SCS-TP-150.* 6 pp., illus. Excessive seepage in farm ponds is usually due to soils in the pond site that are too permeable to hold water. Several methods of sealing leaking ponds are recommended in this paper. The least expensive is by compaction. Sites with too little clay to prevent excessive seepage can be sealed by an earth blanket if there is a suitable borrow area close enough to permit hauling at a reasonable cost. Sealing with bentonite; treatment with chemical additives; sealing with flexible membranes such as polyethylene, vinyl, and butyl-rubber membranes; lining with portland cement; and paving with asphalt are other methods.

Measuring the Effect of Irrigation on Rate of Technological Change. BY JAMES A. BURNS. 1967. *USDA Agr. Econ. Rpt. 125.* 23 pp., illus. Compares irrigated with nonirrigated farms in the High Plains of Texas, and irrigated dry-area farms in the San Joaquin Valley with non-irrigated humid area farms in the Mississippi Delta.

Growing Summer Cover Crops. BY CROPS RESEARCH DIVISION, AGRICULTURAL RESEARCH SERVICE. Rev. 1967. *USDA Farmers' Bull. 2182.* 16 pp., illus. \$0.10. Superseding Farmers' Bulletin 1750 on the same subject, discusses cultural practices and 14 crops commonly used.

Soil surveys

Kay County, Oklahoma. BY JAMES R. CULVER. 1967. 86 pp., illus. maps 3.17 inches to the mile (1:20,000). Fieldwork by James R. Culver, William R. Bain, and Beryl G. Baggett.

Indiana County, Pennsylvania. BY JAY B. WEAVER AND JOSEPH D. RUFFNER. 1968. 110 pp., illus.; maps 4 inches to the mile (1:15,840).

Gray County, Kansas. BY BOB I. TOMASU AND WILLIAM E. ROTH. 1968. 59 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Cabezon Area, New Mexico. BY JAMES J. FOLKS AND WALTER B. STONE. 1968. 44 pp., illus.; maps 2 inches to the mile (1:31,680).

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LAND CONSERVATION AND WATERSHED DAM, FILLMORE SOIL CONSERVATION DISTRICT

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From the Administrator:

Planning for Water and Related Resources



We are beginning to see the fruits of more than a decade of river basin investigations carried on under a variety of cooperative arrangements with agencies both inside and outside the Department of Agriculture.

In several locations, comprehensive reports are in the hands of local community leaders and responsible State and Federal officials; in others, information gathered in river basin studies is shaping the thinking of local leaders even before the survey recommendations are put in final form.

The results are evident in the increasing clarity with which local people see their water and related land-resource problems and identify feasible solutions. Watershed project applications and plans from areas where river basin surveys are completed, or nearing completion, better meet the criteria for prompt approval and rapid execution. Such projects emphasize multipurpose plans and are noticeably better coordinated with other related resource and economic developments of the region.

In its statement on *Resources in Action*, the Department stresses the necessity of water and related land-resource developments as essential to the sustained economic growth of the Nation. An adequate supply of good quality water stimulates the economy of local communities. The reduction of water pollution to acceptable levels is essential to this accomplishment.

Upstream watershed projects are an excellent means of providing many of the water-related goods and services needed to sustain the national economy. River basin studies offer excellent opportunities to make the watershed program of

SCS and the Department increasingly effective.

During this year we are participating in 52 studies. Ten are "framework" studies and the others are "detailed comprehensive" studies. Let's examine what each type can provide.

Framework studies establish broad guidelines within which water and related land-resource development programs could effectively operate in the public interest. They determine for major water-resource regions what portions of the national needs for economic goods and services could be supplied by each region for the present and for specific periods in the future. They assess the availability of suitable land and water resources for each of these periods, giving consideration to the requirements on the resources to meet other needs. They define and evaluate alternative approaches to meeting the needs and identify sub-basins where more detailed studies are needed to determine which alternative is in the best interest of all the people.

Within this kind of a framework, it can then be determined where upstream watershed projects are the most feasible means of providing watershed protection and flood protection, irrigation, municipal and industrial water supply, water-based recreation, fish and wildlife enhancement, and storage for water-quality management. Also, it can be determined where it is desirable to move slowly until a detailed study has been made.

Comprehensive detailed studies go further and identify projects which have a high priority to be installed within the next 10 to 15 years. In addition, the alternatives are analyzed to determine which

are in the best interest of the communities and the regions concerned.

Combinations of upstream and main-stem developments are examined to determine the needed scale and scope of each and to indicate priority of development.

Decisions as to which alternative is selected in each case should be made by the people in the communities affected on the basis of knowledge of the effects each alternative would have on different segments of the community. For example, the cost of benefits foregone by the agricultural segment as a result of flood-plain inundation should be considered fully.

Detailed comprehensive studies enable the Soil Conservation Service to identify interrelationships between potential projects within a sub-basin; to recommend priorities of establishment based on these interrelationships and identified needs; to define the nature and scope of project development needed to assure that present and future needs can be met; to recognize where immediate action is needed to preserve reservoir sites; and to help local people plan ahead to meet their needs.

These studies help also to identify conditions where other types of resource conservation and development projects are needed. They have in some instances stimulated the formation of new soil conservation districts by local people. In many cases they have motivated local sponsors to take immediate action on potential watershed projects; in others they have eliminated the need for preliminary investigations on watersheds that are not potentially feasible projects under present criteria.

River basin plans contain valuable information that should be put to work at all levels of SCS organization in order to accomplish the Department's stated goal of "planning and developing all major river basins on an orderly basis in relation to the needs of all people."

D. A. WILLIAMS



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Diversions and tillage reduce erosion for wheat farmers

By George C. Welch

*Soil conservationist (dryland specialist),
SCS, Pocatello, Idaho*

A combination of diversion terraces, chiseling, and stubble mulching brought erosion rates down to a tolerable level on a group of wheat farms in the Side Canyon area of the Rock Creek watershed in the Power Soil Conservation District, Idaho.

The practices were installed by cooperators who were alarmed by what happened to their wheat fields during the heavy rains and floods of December 1964 and a cloudburst in July 1965.

They had seen their hillsides riddled with gullies and some of the watercourses cut down as much as 15 feet. On-the-ground measurements indicated soil losses of more than 100 tons an acre in some fields, and 300 to 400 tons where double summer fallow was practiced.

Through cooperative planning by the district supervisors, the Agricultural Stabilization and Conservation Service County Committee and office manager, the Soil Conservation Service soil conservationist, and the county agent, an ACP "special project" was established to cost-share the needed conservation measures in the dryland wheat area of Power County.

During 1966, the farmers in Side Canyon constructed 33,000 feet of diversion terraces, 27,900 feet of grassed waterways, three debris basins, and two grade and outlet stabilization structures. They planted grass on 21 acres of water-



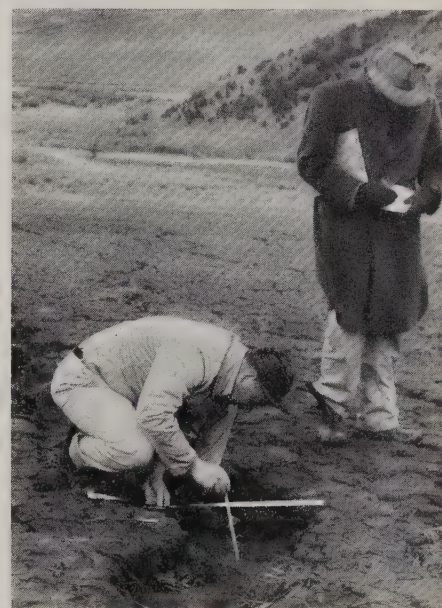
ways and diversions and 82 acres of pasture and hayland, and did 2,410 acres of subsoiling.

Two neighbors, Raymond Kress and Jack Richards, filled in their gullies and constructed diversion terraces at intervals four times the spacing for contour stripcropping. Then they contour-chiseled between the diversions to a depth of 10 inches on 2-foot spacing.

The 1967 spring moisture was above normal, and during June and July several intense summer storms occurred. According to farmers in the area, these storms at least equaled the damaging storm of 1965. Again damage was heavy on untreated areas, but where the conservation practices were used, erosion measurements revealed a loss of only 5 to 6 tons of soil an acre.

Although all the needed land treatment is not yet completed, the Side Canyon area is well on its way to establishing a good dryland conservation program. ♦

SCS Work Unit Conservationist Oscar Onstott (below) measures depth and width of a rill while Hugh McKay, superintendent of Tetonia Agricultural Experiment Station, takes notes as basis for estimating soil loss by erosion. Raymond Kress (right, above) and the author observe the first diversion terrace constructed in the Power Soil Conservation District. The stubble still stands on the intervals where chiseling has been done.



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DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES



BEHIND THE SCENES IN SOIL SURVEYS

The laboratories Maps Publication Progress

Soil Stewardship Week

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: A conservation farm in the Montgomery County Soil Conservation District, Md., illustrates good soil stewardship.

Surveys . . .

What is a soil survey?

More people than ever before are seeing and using them, as builders, engineers, and land-planning officials discover their value in urban as well as farm situations.

Every soil conservationist has been familiar with soil surveys throughout his career.

He has known the soil scientist walking alone across field and pasture, digging, studying, and mapping the soils.

He has studied the rough field sheets and exchanged information about the soils with the surveyor.

He has used the finished maps and heard the soil scientist explain their meaning to land users.

And he has welcomed the final publication containing all the maps of an area and the detailed descriptions and interpretations of all the soils—the end product, the “published soil survey.”

Behind the scenes: What goes on between these normal contacts with the soil survey by its users?

Deputy Administrator Charles Kellogg gave his personal attention to the articles by Soil Survey staff members Alexander (p. 219), Orvedal (p. 222), Barnes with Editor McSweeney (p. 225), and Derr (p. 231) in telling the behind-the-scenes story of soil surveys.

Stewardship: The staff-written history of Soil Stewardship Week (p. 235) brings together for the first time information about the origins and progress of this national observance. The resulting perspective helps explain the growing significance of the affair.

soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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JOHN A. BAKER, Assistant Secretary of Agriculture

DONALD A. WILLIAMS, Administrator, Soil Conservation Service

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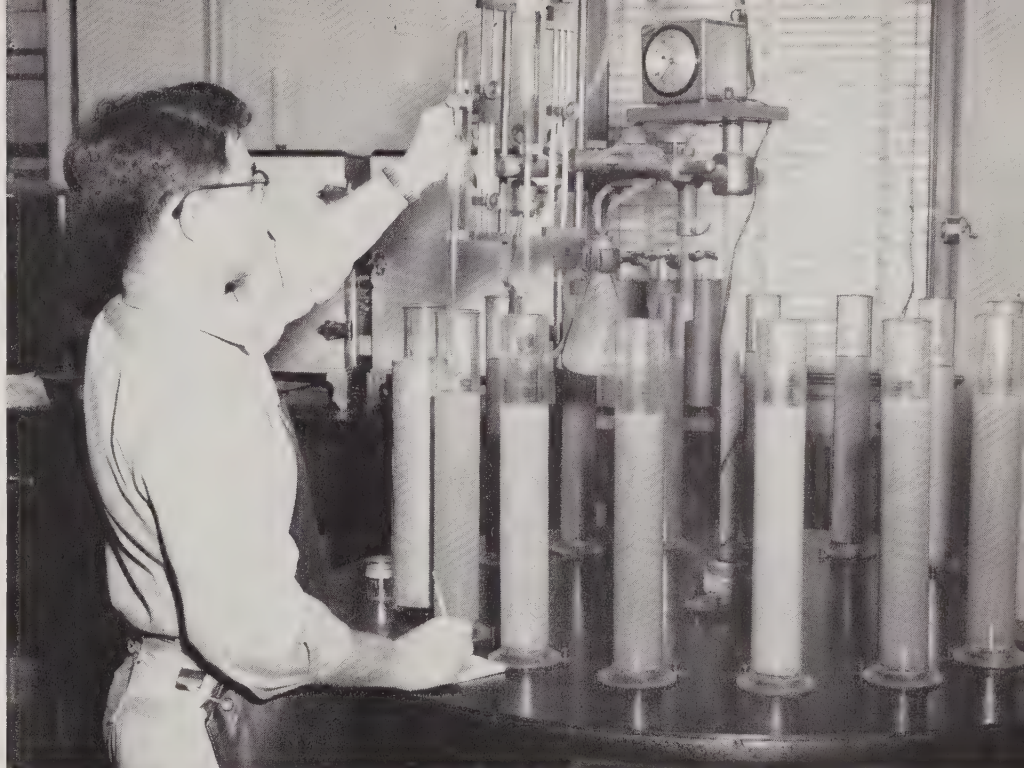
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Determining the proportions of different-sized particles in the composition of soils is one of the major tasks of the Soil Survey Laboratory. The sand is first removed from a sample by sieving, then the remainder is suspended in water and allowed to settle in a cylinder. Since silt settles faster than clay, after a time only clay remains in the upper part of the column. The clay portion is removed with a pipette (right), the water evaporated from the two fractions, and the residues weighed.



Some of SCS's soil scientists work with beakers, balances, and microscopes, rather than with augers, shovels, and maps. They are the laboratory workers who weigh, measure, and analyze some 2,000 soil samples collected annually to help the fieldman in making and using soil surveys.

The Soil Conservation Service has a system of three laboratories that give support to field soil scientists. They are located at Beltsville, Md.; Lincoln, Nebr.; and Riverside, Calif. Their staffs of scientists and technicians make more than 20,000 determinations each year to answer questions that fieldmen cannot answer for themselves.

The Soil Survey Laboratories give most of their attention to measuring the properties of soil that are to some degree permanent and that have value in classifying soils in the national system. Such properties as particle-size distribution, mineralogical composition, and base-exchange characteristics are useful for this purpose. This is in contrast to the measurement of fertility levels in individual fields that may be altered radically by a single large application of fertilizer.

In addition to helping to identify

and classify soils, laboratory tests also provide information that helps to predict how specific soils will react to use. For example, the measurement of "COLE"—i.e., "coefficient of linear extensibility"—is a significant indicator of the stability of a soil for supporting buildings. And laboratory evaluations of the normal nutrient status of the various soils help to interpret their potential productivity.

Unusual problems in crop production or other aspects of soil management are sometimes solved with the aid of laboratory tests or by the joint investigation of laboratory and field scientists.

Thus, the soil survey laboratories of the Soil Conservation Service perform functions quite distinct from those laboratories of research institutions or of the "soil testing" laboratories of State colleges and commercial concerns that make specific fertilizer recommendations to farmers and gardeners. The SCS laboratories work hand in hand with the field staff in making soil surveys and providing soils information to farmers, builders, and other land users.

The settings of the three Soil Survey Laboratories are varied.

The Soil Survey Laboratories

Scientists with beakers and balances support fieldmen in making and interpreting maps

By Lyle T. Alexander

Chief, Soil Survey Laboratories, SCS, Beltsville, Md.

The Beltsville, Md., laboratory is in the Soils Building at the Plant Industry Station with spacious grounds. The Lincoln, Nebr., laboratory is on the upper floor of a downtown building. The Riverside laboratory is in three small one-story buildings on the grounds of the Agricultural Research Service Salinity Laboratory at the foot of Mt. Roubidoux, a few blocks from downtown Riverside, Calif. All three laboratories are equipped to do any work that is needed to answer specific questions.

When soil samples reach the laboratory they are prepared according to the kinds of determinations to be made. Usually there is a bulk sample of 5 to 10 pounds that is air dried and has the larger particles removed. The sample is then ready for such tests as those for particle-size distribution, base-exchange characteristics, organic-matter content, and acidity. Samples for microscopic study of the pat-

terns of arrangement of soil particles and other special studies are kept in their natural uncrushed state.

When the results have been recorded in notebooks and necessary calculations are made, the findings are sent to the State office and the field soil scientist for checking for any possible errors or suggestions for any additional work that may be needed.

If the results are satisfactory, the information is available for immediate use. An interim report is issued for general use in the originating State and in areas that have the same or similar soils. Accumulated data for each State are published in a series of Soil Survey Investigation Reports that go to SCS field soil scientists and agricultural libraries and are available to soil scientists generally.

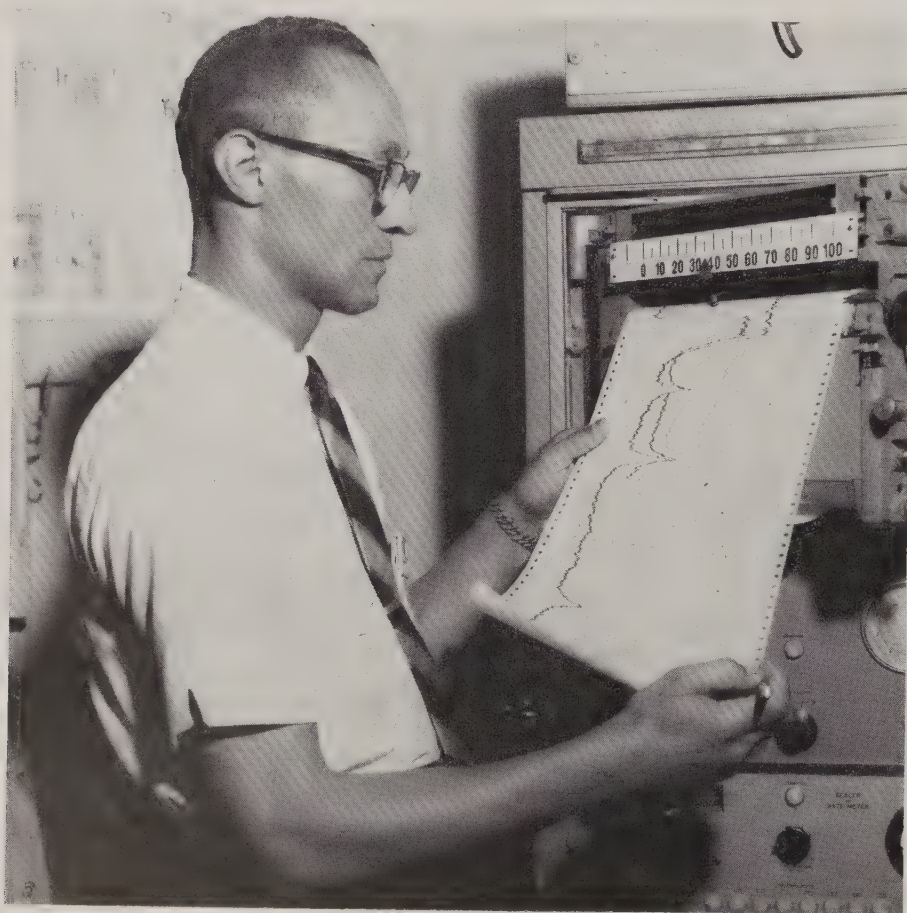
The laboratory results provide essential information to field soil scientists making soil surveys. The

man in the field must make many on-the-spot judgments of texture, mineral composition, and other properties of soils that enable him to recognize different kinds and draw their boundaries on a map. Such judgments are not always an adequate basis for technical soil descriptions, however, and they cannot be made consistently without comparison to some standard of objective determinations by laboratory methods.

For example, an experienced soil scientist can feel a sample of soil and estimate the amount of clay present, but only the laboratory can determine how much is actually there. Since so many determinations are needed in mapping, field evaluation must serve in the majority of instances. But to have good results, the field soil scientist needs to check his results against samples for which particle-size distribution has been determined in the laboratory.

Perhaps the most common chemical tests used by the field scientist are those for acidity and for carbonates. Both are made in the field because the data are needed for immediate decisions on soil classification or on the nature of the soil being studied. The fieldmen can evaluate soil acidity with a test kit, but laboratory analysis is necessary to determine the kinds of bases present and the degree of base saturation that is the reason for the acidity.

The field soil scientist can sometimes recognize quartz, feldspar, and mica in a soil sample, but laboratory tests are required to determine the percentage of weatherable materials. This information is necessary for the proper placement



In X-ray fluorescent analysis, a small sample of soil is placed in position and bombarded with high-energy X-rays. The treatment causes it to emit fluorescent X-rays whose wavelengths are dependent on the chemical elements present in the sample.

In the study of the mineralogical composition of soils, thin sections are examined and photographed with a petrographic microscope.

of some soils in the classification system.

The COLE measurement is a good example of a laboratory determination that is necessary for interpreting the suitability of many soils for various uses. It tells how much the natural structural units of the soil—technically, the “aggregates” or “clods”—swell on wetting and shrink on drying. The COLE value indicates how stable a soil will be as a foundation for buildings. It also measures the tendency of a soil to seal at the surface and cause excessive runoff, even with moderate rainfall.

For making COLE measurements it is necessary to take, very carefully, fist-sized blocks of undisturbed soil into the laboratory. The blocks are dipped in plastic and dried at the sampling site to preserve their natural structure in transit. Then they are packed in ice-cream cartons with a cotton bedding for transport.

In the laboratory, the volume changes of each natural clod are measured as it is allowed to wet and dry. These measurements are made for each soil horizon. From the thicknesses of the various horizons, a summation can be made of the amount of rise and fall of the whole soil to any appropriate depth. The calculations are made on a properly programmed computer.

Special laboratory determinations are used to explain the reactions of certain problem soils and to overcome local difficulties in soil use and management.

For example, some soils in the Southeastern Coastal Plain are notoriously unproductive. Trees grow very slowly on these soils, and rarely have they been farmed. Somehow early farmers sensed, or



found by trial and error, that they should be left in timber.

These are very old soils, and laboratory tests show that they are so low in exchangeable bases, especially calcium, that plants cannot grow normally unless they get substantial amounts of fertilizers. The problem of using these soils is essentially the same as for large areas of old soils in the Tropics. The plant nutrients are so scarce that few roots penetrate much below the surface, and they are unable to use the moisture stored in lower soil.

Some of the soils of the Eastern Highland Rim in Coffee County, Tenn., have a mantle of silt several feet thick. Until recently this was assumed to be a windblown material, but a logical source for so much windblown silt was not apparent.

A restudy of the Sango and Dixon soils in the fall of 1967 led to the hypothesis that the silt was

derived from limestone that once was extensive in the area. The laboratory determined that the silt particles were indeed of the same kind and size as those found today as an impurity in remnants of the limestone. It was concluded that the silty material was left from the impurities in the limestone and was not something blown in by wind. It was found also that it took a 20-foot thickness of the limestone to leave as residue a foot of the silty soil material.

The SCS Soil Survey Laboratories help to pinpoint the causes of soil differences. They measure many of the properties that cannot be evaluated by the field soil scientist. By working jointly to diagnose problems, to collect appropriate soil samples for critical measurements, and to interpret the results, both the laboratory scientists and the field scientists learn far more than either group could do alone. ♦

Small scale maps for the big picture

By Arnold C. Orvedal

Assistant director, Soil Survey Investigations, SCS, Washington, D. C.

The demand for small-scale soil maps, that show a whole county or larger area on a single sheet, is increasing sharply, partly because of the new emphasis on community and regional planning.

Small-scale soil maps present general views of soils in contrast to detailed views given by large-scale maps like those in published soil surveys.

There is an especially strong demand for maps at scales between 1:125,000 and 1:250,000, roughly 2 to 4 miles to the inch.

Maps at these scales usually are made by generalizing from large-scale, detailed soil maps. Because of current needs, some small-scale maps are based on field reconnaissance coupled with interpretation of topographic maps, geological maps, airphotos, and other sources of information for areas still lacking detailed soil surveys.

Soil associations

Because individual kinds of soils commonly occur in small rather than large areas, nearly all map units on small-scale maps are made up of two or more kinds of soil. These map units are called "soil associations," meaning that the soils are geographically associated. Adjacent soils are not necessarily similar; more commonly they are contrasting in characteristics that influence their use.

The two diagrams with a portion of the generalized soil map of Jefferson County, Ky., shown on the following page, illustrate the patterns of soils occurring in two broad areas of the county.

Let us examine in some detail the Crider-Corydon Association, which occupies area 6 of the map.

Although simpler than many, it illustrates what is meant by the term "soil association."

The Crider soils lie on broad, gently sloping uplands between the drainageways. The Corydon soils occupy the rather steep slopes between the uplands and the valley bottoms. These contrasting soils occur in a regularly repeated pattern of distribution. Such repeating soil patterns are characteristic of properly defined soil associations.

The association's name

Since Crider and Corydon are the principal soil series of the association, their names, joined by a hyphen, give the name of the association: Crider-Corydon. The diagram shows slope phases within both series. Thus, this map unit is an association of phases of these series.

The diagram also indicates a small area of Huntington soils, which makes up a small but repeating component of the association. Small, commonly irregular, areas of other kinds of soil, not shown in the diagram, may also make up regular or erratic parts of the mapping unit.

The published Soil Survey of Jefferson County explains that the Crider series makes up about 70 percent of the association as mapped and the Corydon about 15 percent. Minor areas of other kinds of soil, including Huntington, make up the remaining 15 percent.

The Crider soils are deep and gently sloping; the Corydon soils are shallow and rather steep. Obviously, the principal soils in this map unit have highly contrasting combinations of characteristics that determine their responses to man-

agement for different purposes.

The Crider soils of less than 6 percent slope have only *slight* soil limitations for use as building sites for dwellings with septic tanks; those between 6 and 12 percent slope have *moderate* soil limitations. All the Corydon soils have *very severe* limitations for this use, and so do the Huntington soils.

Limitation ratings of *slight*, *moderate*, and *severe* are commonly used in soil survey interpretations. In some areas the severe class is subdivided into severe and very severe where the differences are significant. The criteria for separating severe from moderate classes remain the same in either event.

Limitation range

In our example soils with limitations that range from slight to very severe lie within the map unit shown as Crider-Corydon. With this range, how can interpretations about the map unit be set forth clearly? Several approaches have been tried, some more satisfactory than others, but none completely satisfactory.

First, the description might simply indicate the dominant interpretive rating or the one of greatest extent. In our example, such a rating would be slight, or slight to moderate. The fact that about 15 percent of the soils have very severe limitations would be left for the reader to discover in the detailed text description.

A second approach is to suggest an average rating. This is less satisfactory than the first one because if half of a soil association has a rating of slight and half severe, the average would be moderate, and such a rating could be quite misleading.

General soil groupings used to portray landscape patterns for regional planning

A third approach is to indicate the full range of limitations, which, for the Crider-Corydon association, is from slight to very severe. This is unsatisfactory because many soil associations include kinds of soil that range from one extreme to another. Many unlike soil associations would not be differentiated.

A modification of the third approach is to give the range in ratings and also to specify the rating that applies to some large percentage, say 50 percent or more, of the soils in the association. For our example, the interpretation then would be: "Slight limitation more than 50 percent; range, slight to very severe."

By further elaboration of this approach, the percentage of the area of the Crider-Corydon association in each limitation class could be given as follows: "Slight, 55 percent; moderate, 15 percent; severe, 0 percent; very severe, 15 percent; undetermined, 15 percent." This convention gives the facts reasonably well but fails to identify which kinds of soil have slight, moderate, or very severe limitations.

Superficially, it might be argued that because individual kinds of soil in associations cannot be delineated at the small scale of the map, the reader should not be burdened with the names of those soils having particular limitations. Yet the principal components of soil associations can be readily distinguished in the field. The user of the map needs only to learn the descriptions of the few kinds of soil in the association covering the land that interests him specifically. He can easily visualize, even without the aid of a diagram, that the

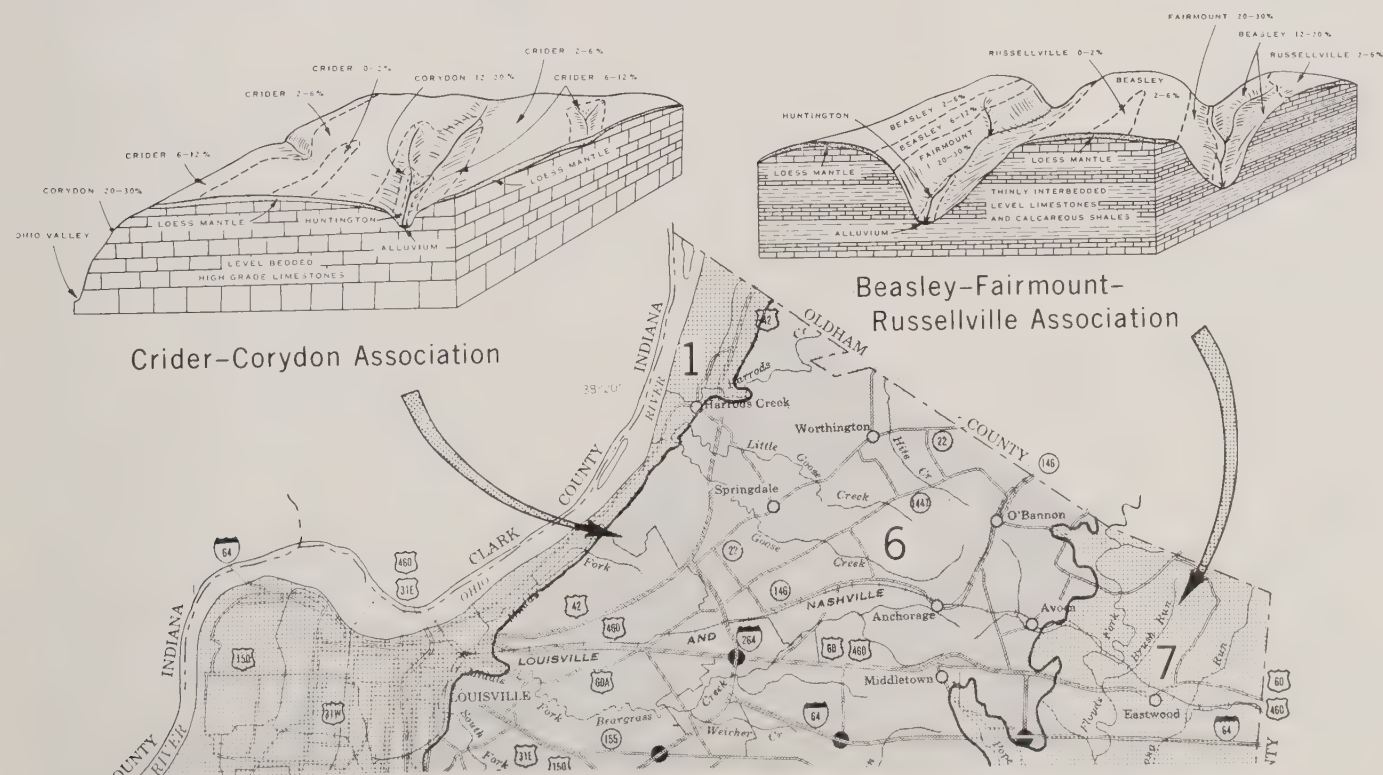
Crider soils are deep and gently sloping and the Corydon soils shallow and rather steep. These characteristics are clearly brought out in the printed soil descriptions and are easily recognized on the ground.

A peg to hang it on

People who use soil interpretations find that the soil names are useful pegs on which to hang a vast amount of information, both that included in published soil surveys and that which they see for themselves in the field.

A simple table like the example on page 224 can be used to set forth the main facts about the specific kinds of soils in an association. If the table is not too large, it can be placed on the map sheet along with the legend, or, it can be a separate sheet or a table in a special report for the map. The format for such a table can be adjusted to meet the local needs, both as to the degree of refinement and the relevant kinds of interpretations.

The block diagrams show the relationships of different soils to each other and to bedrock and topography in each of two soil association areas in a portion of the small-scale general soil map of Jefferson County, Ky. The complete soil map, on a scale of 3 miles to 1 inch, appears on a double sheet in the published soil survey. The block diagrams illustrate text descriptions of the soil associations. Five other associations shown on the complete county map are similarly illustrated and described.



In addition to the small-scale soil map and its interpretations, there is a growing interest in separate maps showing individual interpretations at the same scale.

Such interpretive maps must be carefully designed and explained to avoid misleading the users. An interpretive map for one purpose can be wholly misleading for a different purpose. For example, many kinds of soil with only slight limitations for farming have severe limitations for housing, and vice versa.

Many users prefer colored interpretive maps. It is common practice to use the familiar colors of a traffic signal—green, yellow, and red—to indicate slight, moderate, and severe limitations. The same or a darker red can be used for very severe.

Let us see how this suggestion would be applied to the Crider-Corydon soil association in the diagram. If we need to represent by color the limitations for residential housing with septic tanks, what color should be chosen when we find kinds of soil with slight, moderate, and very severe limitation within delineations of this association?

A joint understanding

Rules can be established. And they need to be agreed on in consultation with the people expected to use the interpretations.

Some users may be concerned mainly with the extent of soils

having slight limitations, and others with those having severe ones. In some localities, areas are colored red if the extent of soils with severe limitations for a particular use exceeds 30 percent of the total. The reasoning is that for certain decisions the soils with severe limitations exert a controlling influence if they make up more than 30 percent of the pattern.

Such a minimum figure might vary according to the kind of interpretation, the availability of land, and the judgments of local planners about what degrees of limitations are critical. The criteria agreed on should be set forth either in the legend or in an explanation near the legend.

Also, judgments about critical limits may change as experience is gained and technological advances are made. Maps colored according to this system, while highly effective for the moment may soon be obsolete.

Besides interpretive maps oriented to specific uses, there are single-factor maps that show one kind of soil characteristic, such as slope, drainage condition, stoniness, or shrink-swell potential. In some localities, where certain soil characteristics have fairly consistent relationships to several soil uses, such maps can be helpful.

Single-factor maps may be deceptively simple, however, since the effect of any one soil characteristic usually depends on others in the

combination. For example, susceptibility of soils to erosion may not be well correlated with soil slope; it may also depend on permeability of the subsoil and of earthy materials beneath.

Occasionally two sets of interpretations or soil characteristics can be shown on a single map, but rarely three, because of the resulting complexity and difficulty of map reading.

Many would like to see combined interpretations of several subjects. Such maps can be made for only very broad uses in community planning, and they need a good deal of testing prior to use. For the present, one map for each interpretive subject is safest.

This means that the number of maps is as large as the number of needed interpretations. Where many interpretations are involved, costs are high and wide publication of such comprehensive sets of interpretive maps is unlikely. But a few sets of interpretive maps can usually be hand-colored for use by planning commissions and key offices.

A basic small-scale soil map accompanied by a comprehensive interpretive table is a highly practical combination. This is one step short of individual interpretive maps, but it provides the essential information and permits the using office to have special maps colored according to limitations to meet its own planning needs. ♦

Sample table of soil interpretations

Soil association	Components	Proportion of association	Selected soil characteristics		Soil limitations for selected nonfarm uses				
			Depth to bedrock	Shrink-swell potential	Residential development				
					With septic tanks	With community sewerage	Highways	Wildlife sanctuaries	Intensive play areas
Crider-Corydon	Crider soils, 0 to 6% slopes	55	5	Moderate to high	Slight	Slight	Moderate	Slight	Slight
	Crider soils, 6 to 12% slopes	15	5	Moderate to high	Moderate	Moderate	Moderate	Slight	Moderate
	Corydon soils, 12 to 20% slopes	10	1-2½	Moderate to high	Very severe	Severe	Very severe	Moderate	Very severe
	Corydon soils, 20 to 30% slopes	5	1-2½	Moderate to high	Very severe	Very severe	Very severe	Severe	Very severe
	Other soils	15	—	—	—	—	—	—	—

The soil survey comes inside

Extensive indoor staff backs the field soil scientist to produce a valuable published document

**By Byron A. Barnes
and Charles A. McSweeney**

Soil scientist, Soil Survey Interpretation Division, and editor, Soil Survey Editorial Unit, SCS, Hyattsville, Md.



In the editorial office, each soil survey manuscript is assigned to an editor who directs its progress through the entire process of preparation for the printer.

Although the soil map, showing what kind of soil is where, is usually the focus of interest in a soil survey, there is more to a soil survey than maps.

The laborious job of the soil scientist walking over the land, digging holes, taking samples, and recording his findings on a map is only the beginning of the painstaking process of producing a published soil survey.

The farmer, the builder, the land use planner or conservationist using the soil survey is seldom aware of the additional technical work by soil scientists, cartographers, and editors that has wedded a wealth of factual information to the finished maps.

Yet it is this additional process of gathering facts, verifying and cross-checking them, and expressing them clearly that makes the finished product the useful document it is.

Published soil surveys are regularly recognized as authoritative

evidence in courts of law. And estimates of benefits from soil surveys range from \$40 to \$175 for each dollar of cost, assuming that the surveys are useful for at least 25 years.

Since 1900, soil surveys have been made and published for nearly 1,000 counties or other geographical areas in the United States. Early users were farmers, ranchers, and foresters. In the late 1920's and especially during the second World War, engineers began to use them, especially for planning highways. In recent years new groups have learned to appreciate their value—public planners, water users, builders, and developers—especially those interested in community development in rural areas and near urban centers.

Let's explore some of the things in addition to field mapping that have to be done to make the product valuable to this wide range of users.

Since our knowledge about soils has been growing rapidly, and many new kinds of soil problems have arisen, the soil scientist must be alert as to how his factual information may be interpreted by many kinds of users.

So, as he makes the survey, he keeps in touch with agronomists, foresters, engineers, conservationists, planners, and other specialists. He keeps notes on the observations he makes on how the different soils behave under different uses and varying types of management.

He asks himself: Would this soil be suitable for septic tank filter fields? How would it suit for building foundations? Would it corrode underground pipe? How about its use for certain forms of recreation? He tries to find answers to such questions and makes notes.

As the soil scientist examines and studies the soils, field by field and farm by farm, questions invariably arise that he cannot answer and he

must turn to the laboratory for supplementary data. Through field and laboratory studies, the kinds of soil within the survey area are defined and described. Each kind of soil is identified and correlated in terms of a nationwide system of soil classification. Through the use of this system each kind of soil is called by the same name wherever it occurs in the country.

The soil scientist records the boundaries of the different soils on aerial photographs. These, when complete, are called soil survey field sheets. Boundaries on the field sheets are transferred, in the cartographic unit, to an aerial mosaic base that has been corrected for variations in scale.

Text for map

The soil map can be useful only if accompanied by a text that describes the soils shown and how they may be used. The soil scientist compiles this kind of information, along with descriptions of the different soils, as he makes the survey. This information becomes the

manuscript for a published soil survey.

Manuscripts assigned for editing in fiscal 1968 averaged 334 double-spaced typed pages, 56 pages of tables, two to four three-dimensional diagrams, 18 photographs, and 100 or so survey field sheets.

Lead time for maps

Cartographic work on the map begins at least 3 years in advance of publication in order that the map may be prepared and the soils correlated by the time the manuscript is ready.

Manuscripts for publication are first reviewed by a soil scientist for technical content and accuracy. Additional information needed is requested from the author. Then the manuscript is assigned to an editor.

The editor wants to help the reader clearly understand what is written in the publication, and to quickly find the information he wants. His general guides are short words, short sentences, and short paragraphs. The editor retains technical terms for which there are no

popular equivalents and defines them in the glossary.

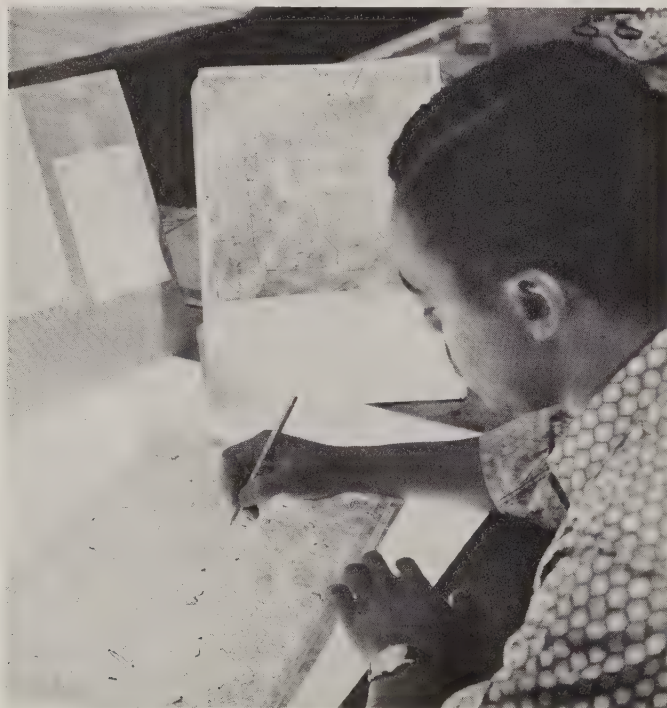
The editor also helps the author in checking for accuracy. Errors can occur at any stage of publication. Keeping map symbols in the text in agreement with those on the soil map is only one example. Symbols can be erroneously changed when the author reviews the edited manuscript, when the printer sets it in type and delivers the galley proof, and again when the printer prepares page proof. The editor has to look at all stages of the process.

The editor checks a draft copy of the detailed soil map against the edited copy of the text. The text must agree, or be made to agree, with what is shown on the map. Ordinarily the author first sees the soil map and text together when he receives a copy of the published soil survey.

The precise word

More complicated is checking to assure uniform use of the author's technical vocabulary and the standard technical terminology of soil

Soil map symbols are transferred (left) to the manuscript from the original survey sheets after being converted through a correlation legend to their published form. A mosaic of map sheets tacked to the wall (right) facilitates checking for agreement with details mentioned in the text.



survey. The need for precision increases as more information about soils is prepared for computers. Computers will not forgive if the soil scientist writes "weak fine platy" in one place and "weak thin platy" in another.

Checking and reorganizing for consistency in style and logical presentation is another time-consuming job of the editor. Readers use a soil survey in somewhat the way they use an encyclopedia. Descriptions of the soils need to be arranged in such a way that a reader can find the same kind of information at approximately the same place in all the soil descriptions. The same applies to groups of soils; for example, the land capability units for farmers, the woodland groups for those who own or operate woodland tracts, and the engineering groups.

Editorial staffs check literature citations to be sure that they are accurately listed and spelled and are currently available. They see that illustrations are functional and will reproduce well. They obtain clearance from other agencies. They mark the manuscript with instructions to the printer on kind and size of type, locations of legends and footnotes, headings, and tables.

Most important function

The most important function the editor serves is to see that the author conveys to the reader what he intended to convey. Putting in punctuation marks and complying with printing office style are the least important things. The author's main concern is the message about the soil. The editor's main concern is getting the information into form for the user.

After editing, the manuscript is reviewed by SCS soil scientists and by cooperating agencies. Corrections made by authors are again reviewed by the editor and the final manuscript is then ready for printing. The last job is checking galley and page proofs. ♦

A conservation profile . . .

Missouri's first woman supervisor

"She isn't here, she's down in the field mowing hay." That's the answer Ben Feldewert got when he called to ask Mrs. Betty Broemmelsiek to be a district supervisor for the St. Charles Soil and Water Conservation District in Missouri. Ben is chairman of the board.

Later he did talk to her, however, and now Betty is Missouri's first woman supervisor. Her appointment was effective July 1967.

The title is added to an already long list of affiliations. Basically, she considers herself a farmer—farmerette, if you will. A herd of 140 registered Angus cattle, a flock of 85 sheep, and the work they create qualify her for the position.

She is also a teacher in the St. Louis schools. Her farm provides an ideal outdoor classroom for her fourth, fifth, and sixth grade students, who think milk comes from a carton at the supermarket. Since starting the study tours 10 years ago, Betty has had as many as 400 kids at a time watching cows being milked and "fishing for fun" in the ponds on the farm.

Five hundred and twelve acres of mostly grass and ponds allow the kids to see conservation practices in action on the land instead of just reading about them in a book.

Betty and husband Jack started their "classroom" farm at the end of World War II with 45 acres. The latest addition was a 170-acre farm bought in 1966. They shocked the original owner by starting a parade of lime and fertilizer trucks to the pasture before he had even had a chance to move away.

Some conservation work had already been done on the farms they



Mrs. Betty Broemmelsiek.

have bought, but the Broemmelsieks have made improvements. Since becoming cooperators with St. Charles District in 1961, they have seeded 100 acres of fescue, timothy, and alfalfa-ladino-grass mixtures for pasture and hay. They improved the terraces and waterways, built a number of new ponds, and plan to build more. A 12-acre pond was under construction while Betty was attending her first annual meeting of the Missouri Association of Soil Conservation District Supervisors at Cape Girardeau.

Betty is a 1939 psychology graduate of Oberlin College and Washington University. Jack is president of a drug package manufacturing firm in O'Fallon, Mo.

"That's in the daytime," said Betty. Nights and weekends he helps her farm. They have four children. One daughter teaches French in Illinois, another is a student at the University of Wyoming, and a third is at home looking after the horses while she finishes high school. Their son is in the Marines.

Since the farm operation has grown so large, a man and his wife help with the enterprise. Asked if the hired man does the tractor driving, Betty quickly replied, "Well—he drives his tractor and I drive mine." ♦



A lot of knowledge in a hurry . . .

A work project in Algiers

By Charles M. Hood

State soil conservationist, SCS, Columbia, Mo.

Through your interpreter you have just been told by the local officials that 500 to 1,000 people in the village are on relief. They want to put them all to work in the next few days.

If you are a soil conservationist assigned to direct a work and conservation project in a foreign land, as I was in Algiers in 1963, you will realize that you have your work cut out for you.

These people are to install soil and water conservation practices, but they have never seen a terrace or a water-detention dam. Your heavy equipment will consist of mattocks, tampers, shovels, and perhaps a few wheelbarrows.

The project work area may vary from a few hundred to a few thousand acres in size. Included in these large Government-owned tracts will be several privately owned areas of small irregular tracts. The individual work projects will have to be within 5 to 10 miles of the village, for the workers must walk to work.

You are not familiar with the language and customs of the people, and you have only read about the climate, soils, and crops. You will acquire a lot of knowledge the hard way and in a hurry.

For example, the layout of a terrace or diversion must be done well in advance. On your first job, naturally you will mark out the work with stakes. When you go back the next morning and find every stake gone, you will need to adjust your tactics.

You realize that fire wood is very scarce, and that you are not going to change the customs of the land. You will find that digging holes makes equally good markers.

If it were necessary to stay strictly with Civil Service procedures, there would be some very interesting job descriptions. For example, the man whose only job requirement is to crack a whip every few minutes. This is to frighten away hungry birds that otherwise would quickly devour all the seed being planted

to establish a plant materials nursery and the little seedlings that are the first results of your work.

As the work continues, the people begin to grasp the importance and significance of soil and water conservation measures. The many frustrations and misgivings fade into the background as the villagers begin to appreciate and make use of the various practices.

The soil and water conservation demonstration project carried out in Algiers from 1963 to 1965 was one of the first in which the technical skills of the Soil Conservation Service were provided as a unit or team to help an underdeveloped country help itself. It was also unique in that the Algerian Government put up half the cost of this \$6 million project. The Algerian Government paid the workers \$0.70 to \$0.90 a day, and the United States provided each man the equivalent amount in surplus wheat and cooking oil.

The project objective was to put as many hungry people to work as possible and to use their labor to set up demonstration conservation projects. Ranging in age from 14 to more than 80 years, the Algerian laborers accomplished an unbelievable amount using only mattocks and shovels. In a few instances, wheelbarrows were avail-



Laborers dig a ditch before laying tile to bring water from the reservoir to a nearby village for domestic use.



Tree seeds planted in plastic bags are carefully watered by hand at the Orleansville nursery, one of three established in Algeria.

Village women obtain pure clean water from a storage basin constructed in connection with a spring development. Water previously lost during the night is now stored in a nearby reservoir and piped to the basin.



able. Thirty-seven different types of conservation practices were established on 53 separate project areas.

This is a land that has been farmed for centuries. Each year there are fewer acres capable of producing the crops needed to feed the increasing population.

The 225,000 acres of detailed soil surveys, made by the Soil Conservation Service, confirmed the seriousness of the soil and water losses in all areas. The completion of 868 grade-stabilization structures; 283,410 feet of grassed waterways; 70 miles of terraces and diversions; 49 acres of bench leveling; the planting of 600 acres of fruit trees; 4,000 acres of forest trees; and the growing of 739,000 trees for planting stock best depict the magnitude of this hand-labor project.

The water conservation and development projects were most appreciated by the Algerian people. Villages were benefited by water from the 18 springs, 30 water-control structures, 10 water reservoirs, and many irrigation systems.

As in all countries, it is impossible to estimate the value and importance of conserving the soil and water resources in Algeria. This need is particularly urgent in countries that are now short of food, fiber, and water. The constantly increasing population further magnifies this problem, and that we cannot expect peace and stability in a nation of hungry people.

Three bushels of wheat, 9 pounds of cooking oil, and 12 dollars in cash seemed to be a very small reward for a month's hard work under a hot desert sun. But this surplus U. S. wheat fed several hungry people, and the physical work involved nourished one other important element—an Arab's pride.

The participation in the conservation of their Nation's resources removed some of the aspects of a relief program. The technical assistance provided by the Soil Conservation Service pointed the way for helping a nation help itself, now and in the years ahead. ♦

Conservationist earns honors and awards

A life-time conservationist, Andrew Carmon, Mayfield, Ky., has earned honors and awards through the years for his efforts and interest in conservation.

In 1964, he received a Master Conservationist Award from the Graves County Soil Conservation District. His first award was in 1948 when he received \$100 and a trip to Hancock County, Ga., to attend the Jamboree Celebration as State winner in the southwide Soil Conservation Jamboree Contest.

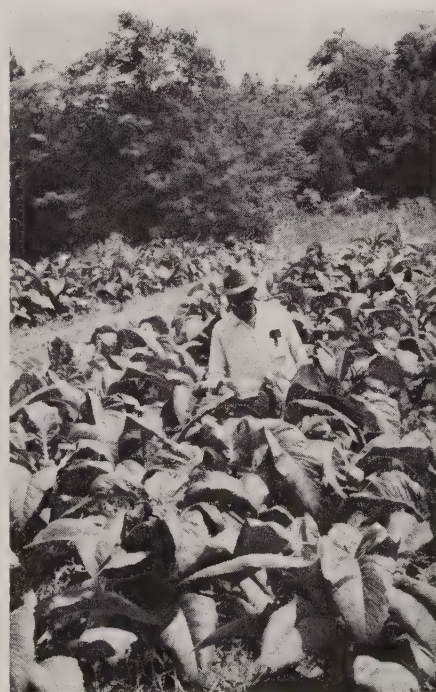
Mr. Carmon bought his first 40 acres of land in Graves County in 1923, worked at public works until 1932, and that year he and his wife moved to the farm and started farming.

He planted 7 acres of corn the first year, between the gullies.

"My yield of 5 bushels an acre was a great surprise to my neighbors," he said. "They didn't think I could get my seed back."

A cooperater with the Graves

Andrew Carmon stands in a narrow contour strip of tobacco between strips of grass.



County District in 1945, Andrew later started a program of terracing and contour cultivation. This practice met with so much favor, he began doing custom terracing for his neighbors. The next few years he terraced about 80 acres of land.

In 1966, he planted his tobacco in contour strips with a strip of grass left between each two strips of tobacco. Today Mr. Carmon owns 82 acres of land free of gullies.

Mr. and Mrs. Carmon are active members of the St. James A. M. E. Church, Carmon serving as a steward and a member of the board of trustees for many years.

The Carmons have two adopted children, and it is partly for them that the Carmons are still trying to use the very best conservation practices for all their land.—H. F. SMITH, *soil conservationist, SCS, Mayfield, Ky.* ♦

Remote sensing aids agriculture

Remote sensing from orbiting satellites may yield much agricultural data of value, reports the Economic Research Service, USDA.

Photographic sensors now exist which potentially could perform many agricultural survey tasks from space platforms: reconnaissance surveys of major land use, soil, water resources, range conditions, and cropping practices.

Agriculturists have used panchromatic aerial photography for many years for mapping and for studies interpreting land use and land capability. Scientists are now expanding this technology.

One technique, multiband sensing, records, at the same time, energy from several different portions of the photographic part of the spectrum. Imagery is normally formed and visually interpreted, but progress in automatic interpretation will eliminate these steps.

Another technique, multispectral sensing, is similar but uses thermal infrared and other nonphotographic parts of the spectrum as well as the photographic part. ♦

Cooperative Soil Survey fixes on year 2000 as target date for completing mapping

By Louis E. Derr

Assistant director, Soil Survey Operations, SCS

The year 2000 has been set as a target date for first-time completion of mapping in the National Cooperative Soil Survey.

The current survey status summary shows 1½ billion acres to be mapped in the next 33 years—more than twice the acreage adequately covered up to the present.

The objective is to survey all the land in the United States, the Virgin Islands, and Puerto Rico, except major metropolitan centers, restricted military installations, and parts of Alaska. This amounts to a total of 2,262 million acres, of which 685 million has been mapped to meet current standards.

About 47½ million acres will have to be mapped annually to complete the "once over" survey by the year 2000. That is about the rate of mapping attained in fiscal year 1967.

A mounting need

The demand for new soil surveys to guide community and industrial development is creating unmatched requirements for soil survey operations. In fiscal year 1967, 254 special soil survey reports with soil maps and interpretations were prepared to fill local requests. Special reports are planned for 433 areas in fiscal 1968, and 580 requests have already been received for fiscal 1968.

Local governments are responding with larger contributions to survey funds. The local non-Federal input has increased steadily over the past several years. In the entire country in fiscal year 1964, about \$194,000 of local non-Federal funds were made available to SCS for soil surveys. The amount available for 1968 is about \$775,000. Most of these funds are provided to accelerate soil surveys in rural and rural-urban transition areas of expanding population and industry.

The table shows the planned intensity of mapping and the remaining job to be done. It gives only a rough clue, however, to the character of the most pressing needs.

A joint plan

In each State, the SCS State conservationist confers annually with State, Federal, and local groups to assemble information for setting priorities for completing soil survey fieldwork and publication of the results. On this basis, target dates and financial plans are made to develop both a long-range and an annual plan for each soil survey area.

The detailed planning of priorities and of designs for individual soil surveys is done within each State in accord with national standards for soil classification, interpretation, and other procedures.

Consideration is given to the requirements of operations programs and technical assistance in the various areas, to local interests, and to related factors so that the resulting surveys will serve the greatest need, especially in places where land use adjustments are critical and private and public investment risks are high.

Although the Soil Conservation Service has national leadership for soil survey work in the Department of Agriculture, the State agricultural experiment stations and other State, Federal, and local agencies contribute to the work and advise on methods and priorities in the National Cooperative Soil Survey. ♦

Irrigation structure repairs a washout

Loss of a summer's supply of water and \$10,000 worth of hay when an irrigation flume gave way spurred the Big Horn Cattle Company to realine the ditch and install a 48- by 72-inch bituminous coated arch pipe with concrete inlet and outlet structures to span the critical area.

The Soil Conservation Service designed the structure for Carl Hanson, manager of the company which is a cooperator with the North Park Soil Conservation District, Colorado.

A leak in the 400-foot wooden flume had saturated a slick ledge of shale causing the old ditch to give way and slide down the mountainside.—DUANE L. JOHNSON, work unit conservationist, SCS, Walden, Colo. ♦

Status of soil surveys, June 30, 1967

	To map Acres	Mapped Acres	Remaining to be mapped Acres	Percent
Detailed soil surveys:				
High intensity	48,682,174	30,111,729	18,570,445	38.1
Medium intensity	1,229,389,339	542,538,168	686,851,171	55.8
Low intensity	406,431,048	95,546,593	310,884,455	76.4
Total detailed	1,684,502,561	668,196,490	1,016,306,071	60.3
Reconnaissance soil surveys	578,054,686	16,926,654	561,128,032	97.0
Total detailed and reconnaissance	2,262,557,247	685,123,144	1,577,434,103	69.7



Cranberries are gathered mechanically from flooded beds.

Sauce for the economy . . .

Cranberries and conservation give a boost to northern Wisconsin

By Jack Densmore

State soil conservationist, SCS, Madison, Wis.

Cranberries, once the traditional dish for Thanksgiving and Christmas, are winning a regular place on American family menus.

Cranberries have, therefore, become an extra special crop for folks who have what it takes to produce them. Among the lucky ones are the owners of wet, extremely acid soils in a generally underdeveloped region in northern Wisconsin.

According to latest figures, Wisconsin cranberry producers are second in the Nation, putting 400,000 barrels of fruit on the market each year. Success of this Wisconsin "specialty crop" is a source of pride and a strong bond of interest for growers in the region. They see this growing industry providing a

needed economic boost to their communities.

Typical of the growers who are riding the crest of the current wave of demand for the crop is Tony Jonjak, a long-time cooperator with

the Sawyer County Soil and Water Conservation District.

Buying some tax-delinquent marshland in Sawyer County, Jonjak started his own marsh in 1939. His first beds were cleared, ditched, and planted with just a "strong back," handtools, and a wheelbarrow. From this small, pioneering start, Jonjak's "home" cranberry plantings have grown to 50 acres. Tony and his son Paul have also developed 45 acres in neighboring Douglas County.

In the past 5 years, Jonjak, with the assistance of SCS Work Unit Conservationist Robert Hoene, has been updating and expanding his cranberry beds. Water-conservation measures are an important part of this improvement.

SCS provides onsite assistance in planning and installing needed conservation practices. Extension Service specialists make recommendations on improved varieties and cultural measures.

Like most cranberry marshes in Wisconsin, Jonjak's development involves a water-storage reservoir with a canal leading from the reservoir to a series of sections or beds 2 to 4 acres in size. The beds are diked, carefully leveled, and pro-



Sorting cranberries provides seasonal employment on many northern Wisconsin farms.

vided with water-control structures to allow flooding and draining.

A pumping station and ditches return tail water from the beds to the storage reservoir, making it available for re-use.

Jonjak plans to add sprinkler irrigation to provide frost protection and eliminate the need for most summer flooding.

Getting into the cranberry business is an expensive proposition. Costs of bringing wild marshland into production may well run \$5,000 to \$7,000 an acre and beds usually do not produce a commercial crop for 4 to 6 years.

The individual sections or beds in the marsh have to be carefully planned and laid out. The beds have to be scalped of the original vegetation, then leveled, diked, and ditched. New beds are started by planting vines clipped from the old beds.

Cranberry acreage in Wisconsin now exceeds 5,000. This is expected to rise at least 10 percent by 1970.

William Zawistowski, chairman of the Sawyer County Soil and Water Conservation District and a grower, sees cranberry production as having a tremendous effect on the local economy.

"Another important industry in our district is tourism," says Zawistowski, "and here we get another bonus from cranberry marshes. ♦

Poor-paying apple orchard is converted into a busy profitable golf course

A 60-acre apple orchard which didn't make the grade as an apple producer is now the delight of the Yakima Valley golfing dubs and duffers.

In 1964, Bob Schultz bought a 60-acre apple orchard 5 miles west of Yakima, Wash. After 2 years of partially freezing out, he began to think of subdividing it. The contour of the orchard suggested a possible public golf course.

In the mind's eye

Curley Huston, a golf professional from Spokane, walked over the ranch in 1966 with Schultz and visualized the fairways and greens of an attractive 9-hole golf course to be.

Schultz, with technical assistance from the Soil Conservation Service through the Hi-Land Soil and Water Conservation District, removed most of the trees, leaving two to three rows on each fairway as a boundary and buffer zone. He disked and harrowed the fairways periodically until about August to keep down the weeds. He installed a fully automatic sprinkler system

with popup heads.

He then seeded a 60-40 mixture of fescue and Marion bluegrass on the fairways and Hi-Land bentgrass on the greens. By mid-October the grass was growing green.

A split rail fence lines the boundaries of the course, and a night-and-day practice range with 24 stalls connected to the driving range completes the facility.

Because the grass wintered very well, the course was ready by April 1967. The opening day was cloudy and cold, but 295 ardent golfers initiated the course. Huston, the course professional, tries to move the players off at 6-8-minute intervals. So far, the weekends have averaged around 280 golfers.

Tree-lined fairways

The most unusual feature of this course is the tree-lined fairways. Huston said he cannot recall ever seeing a golf course with fairways lined with blooming Winesap, Rome, and Delicious apple trees.—DONALD M. GLADSON, *work unit conservationist, SCS, Yakima, Wash.* ♦

Blooming Winesap, Rome, and Delicious apple trees mark the fairways of the Schultz golf course.





Soil surveys used in town, country plans

Many Mississippi counties are using soil surveys developed by the Soil Conservation Service to locate suitable sites for homes, factories, sewage lagoons, streets, and parks. In this way they are eliminating the probability of cracked buildings and streets, flooded homes, and poorly functioning septic tank filter fields.

The Gulf Regional Planning Commission is using general soil maps of Hancock, Harrison, Jackson, and Pearl River counties to develop a comprehensive plan for the Gulf Coast area.

SCS also provided soils interpretations for about 13,500 acres of land in the immediate area of the National Aeronautic and Space Testing Center in Hancock County, for Keesler Air Force Base, Meridian Naval Auxiliary Air Station, and the U. S. Navy Construction Battalion Center at Gulfport.

Brandon, Pontotoc, Ripley, Holly Springs, and Hernando are a few of the towns for which SCS has developed interpretation reports.

Soil interpretations have also been prepared for the Gulf Coastal



Well-planned and constructed streets (above), with building sites fitted to topography and soils, enhance residential communities. In contrast, disregard for natural drainage patterns (below) soon creates serious erosion problems.

Flatwoods Area and the Mississippi Delta Area. A soils brochure published jointly by the Soil Conservation Service, the Agriculture Experiment Station, and the State Extension Service, entitled *Soil Surveys in Mississippi—What They Can Do For You*, gives the reader a bird's eye view of what soil surveys are, how they are made, and how they can be used.

A good many contractors, realtors, and engineers are using soil survey information. Builders and

public officials are becoming aware that it is usually uneconomic and unnecessary to build homes, factories, schools, and shopping centers on unsuitable soils. Areas underlain by high shrink-swell clays, for example, make unfavorable building sites but are excellent for recreation areas, nature trails, and other uses. Fertile bottom lands may be unsuitable for building sites but excellent for farming.—WILLIAM B. PARKER, assistant State soil scientist, SCS, Jackson, Miss. ♦

Soil Stewardship Week

The idea behind Soil Stewardship Week has ancient roots. The concept of man's stewardship for the land appears in many religions, many cultures.

The custom of setting aside special days to give thanks for the precious gifts of soil and water, air and sunshine, began more than 1,500 years ago, in Vienne, France.

In 452, Vienne experienced a year of bad weather and earthquakes, which resulted in serious crop failures and widespread hunger.

The Bishop of Vienne called for prayers and penance for the 3 days preceding Ascension Day. Other communities took up the observance, and the custom of Rogation Days spread throughout Europe and eventually came to Colonial America.

Rogation days became a time of giving thanks to God and of asking his help and mercy. The custom recognized that food was provided by neither the earth alone nor the industrious hand of man. It came also from the bounty of God, and so it was fitting to thank Him for His grace.

"Perambulation"

During England's Elizabethan period, the custom of "perambulation" came into vogue. In this observance, the members of the congregation accompanied the clergy at Rogationtide in walking around the whole parish. Queen Elizabeth designated that the 104th and 112th Psalms be recited during the procession.

Izaak Walton, apparently referring to his local vicar, wrote: "He would by no means omit the customary time of procession, persuading all, both rich and poor, if they

desired the preservation of love, and their parish rights and liberties, to accompany him on his perambulation." This custom was observed in America during colonial days.

In America, the observance of the fifth Sunday after Easter, Rogation Sunday, as "Rural Life Sunday" was launched at a meeting of the International Association of Agricultural Missions in 1929. At that meeting, a resolution was adopted urging the Home Mission Council, the Foreign Mission Conference, and the Federal Council of the Churches of Christ in America to further its observance. During the 1930's, various church services, in their own way, recognized the importance of soil stewardship.

"Soil stewardship"

The first "soil stewardship" observance was held on Sunday, July 21, 1946. It was prompted by A. B. Kennerly, editor of *Farm and Ranch* magazine. This observance was referred to as "Soils and Souls Sunday." His successor, H. L. Gantz, had a similar interest in the growing observance.

When Soils and Souls Sunday was observed on June 29, 1947, the magazine provided kits of literature and references to assist ministers in preparing sermons.

The first national soil stewardship observance occurred May 2, 1948. Still under *Farm and Ranch* magazine sponsorship, the observance was included in "Friends of the Land Week" and was called "Soil and Soul Sunday."

During these observances, the terms "soil stewardship" and "stewardship of the land" appeared more and more frequently in sermons and literature. In 1950, the day was re-

named "Soil Stewardship Sunday."

Interest in Soil Stewardship Sunday grew in the South and in the Southeast. *Farm and Ranch* issued a booklet of selected conservation sermons and other materials for use on the May 21, 1951, observance. Meanwhile, the then SCS regional office in Albuquerque, N. Mex., in response to requests from clergy, circulated materials for the 1951 observance in New Mexico, Colorado, Arizona, and Utah.

National observance

Farm and Ranch continued to sponsor the observance and to distribute booklets and materials during 1952, 1953, and 1954. Because the movement was becoming so widespread, its editor decided that sponsorship of the Sunday should be taken over by a national organization.

Since the inception of Soil Stewardship Week, the National Association of Soil and Water Conservation Districts (NACD) had been especially interested in the advancement of this week as a national event and undertook its national sponsorship in 1955.

An advisory committee of churchmen from several denominations played a significant role in the observance, especially in helping the NACD Soil Stewardship Committee produce informational materials and distribute them to local conservation districts and to church groups. These materials included booklets, church programs, inserts, and posters. From 1958 to 1962, a film was distributed.

Soil stewardship activities

Tours, workshops, and many other activities are planned for Soil Stewardship Week by conservation

districts and other organizations interested in the event. The following examples are typical:

During Soil Stewardship Week of 1966, the Macon County Soil Conservation District of Illinois invited its city dwellers to make a "drive-it-yourself" tour of the countryside. Maps of the route were prepared and distributed. Signs pointing to conservation work on the land were erected. The route was planned to include scenic areas and to show examples of the conservation work landowners were doing.

The Mitchell Soil and Water Conservation District of Texas sponsored a tour for ministers in 1967. A county supervisor of the Farmers Home Administration discussed some of the changing aspects of local farming and ranching. The group observed parallel terraces and conservation cropping systems. "America The Beautiful" slides were shown.

About 60,000 booklets, 600,000 church programs, 1,700,000 inserts, and 12,000 posters are distributed annually by NACD.

NACD's support of Soil Stewardship Week has been to emphasize the citizen's responsibility for the conservation and orderly development of natural resources, focusing attention on recognition of man's responsibility under God to protect and use wisely His precious gifts of soil and water.

NACD is a nongovernmental organization of more than 3,000 conservation districts and their 50 State associations. It has published 12 booklets on Soil Stewardship Week.

NACD stewardship leaders

Several NACD leaders have taken special interest in Soil Stewardship Week. David J. Doneen of Washington, a director of NACD from 1950 to 1955, was chairman of NACD's Soil Stewardship Committee from 1955 to 1960. Mr. Doneen is a wheat rancher and currently a member of the Depart-

ment of Agriculture's Public Advisory Committee on Soil and Water Conservation.

Oscar Laper of Wisconsin was chairman of NACD's Soil Stewardship Committee from 1961 to 1965. Newton Layton of New Jersey became the chairman in 1966.

The late Waters Davis, a Texas rancher and past president of NACD, was a strong supporter of Soil Stewardship Week.

The NACD Soil Stewardship Advisory Committee since 1963 has included the following members:

The Rev. E. W. Mueller of the National Lutheran Council, who is also member of the Faith-Man-Nature Group. Dr. Mueller was a

member of the original advisory committee in 1955 and has been a member ever since.

The Rt. Rev. John George Weber of the National Catholic Rural Life Conference.

The Rev. Lewis Newman of the Southern Baptist Convention.

The Rev. Harold Huff of the Methodist Church.

The Rev. Henry McCanna of the National Council of the Churches of Christ in the U. S. A.

Members of the advisory group meet with NACD leaders twice a year to decide on the subject for the next year's booklet, and to examine the whole concept of soil stewardship in detail. ♦

Meetings . . .

National Watershed Congress forum

The National Watershed Congress presents as its theme "New Dimensions in Watershed Management" at its annual forum on May 26-29 in New Orleans, La.

In keeping with the theme, the keynote address will be "Competitive Demands: The Growing Need for More Effective Systems of Identifying Alternatives and Making Choices in Watershed Development."

An address, "Watershed Development and the Rural Environment," will be given in session 4.

Sessions 2, 3, and 5 will be panels with presentation of special papers in sessions 3 and 5. "The Demand for Water Reuse: The Coming Importance of Renovation and Recycling" will be the subject of a special paper in session 3 and "The Shrinking Timetable for Watershed Development" in session 5.

Illustrated presentation of the story of the 1967 Watershed-of-the-Year and 1968 awards for the Watershed-of-the-Year and the

Watershed Man-of-the-Year will take place in session 6.

There will be a tour on May 29 to the "Mouth-of-the-Mississippi."

Dates and places

May 1-2, Southern Forestry Conference, Jacksonville, Fla.

4-9, American Society of Planning Officials, San Francisco, Calif.

13-17, Environmental Engineering Conference, Chattanooga, Tenn.

14-17, The Garden Club of America, Greenwich, Conn.

16-19, American Agricultural Editors Association, St. Paul, Minn.

19-25, Soil Stewardship Week

26-29, National Watershed Congress, New Orleans, La.

26-30, Urban Land Institute, Atlanta, Ga.

June

2-7, American Water Works Association, Cleveland, Ohio.

4-7, National Rivers and Harbors Congress, Washington, D. C.

9-12, American Seed Trade Association, Chicago, Ill.

9-14, General Federation of Women's Clubs, Boston, Mass.

15-22, Outdoor Writers Association of America, Inc., Gardens, Ga.

19-21, American Society of Agricultural Engineers, Logan, Utah.

23-27, National Association of Sanitarians, Washington, D. C.

23-26, American Institute of Architects, Portland, Oreg.

28-29, American Institute of Architects reconvenes in Honolulu, Hawaii.

30-July 2, Newspaper Farm Editors of America, Denver, Colo.

30-July 5, National Education Association, Dallas, Tex. ♦

Review



Changing Patterns of Fertilizer Use. BY VARIOUS AUTHORS. 1968. *Soil Science Society of America, Madison, Wis.* 466 pp., illus. \$7.50.

In this book 34 authors, mainly specialists in soil fertility, present the papers given at a symposium held in Chicago in February 1968. The result is an authoritative, up-to-date statement on the uses of various kinds of fertilizers in the United States for a wide variety of crops, along with some regional adaptations; how fertilizers are marketed; methods of testing soil needs for fertilizers; methods of application; and a little about the economics of their use. In addition a bit of the historical and scientific backgrounds of these topics is included.

A general soil scientist would have given much greater emphasis, perhaps, to the interactions of fertilizer use with the other basic farm practices that contribute to yield and efficiency. Curiously, two wide uses of soil classification and soil maps are scarcely mentioned: (1) To sharpen the interpretations of soil test results, and (2) to suggest the potential responses of the many contrasting kinds of soil to intensive management systems that include fertilizer.

The book will be highly useful to those readers who already understand the additional principles necessary to apply the valuable information that is presented.—CHARLES E. KELLOGG, *deputy administrator for soil survey, SCS.*

The People Left Behind. BY THE PRESIDENT'S NATIONAL ADVISORY COMMISSION ON RURAL POVERTY. 1967. (Govt. Print. Off.) Washington, D. C. 160 pp.; paper. \$1.00.

This report by the commission, headed by Gov. Edward T. Breathitt of Kentucky, is a comprehensive

study of the existence of poverty and community problems in rural America.

The report takes into consideration such factors as status of rural labor, training and retraining, availability of land resources, adequacy of nutrition, housing, health, and cultural opportunities, status of rural youth, impact of rural migration, exploration of new and better means to combat the causes that perpetuate rural unemployment, and other related matters.

The report makes specific recommendations for action by local, State, and Federal governments, along with private enterprise, to provide opportunities for the rural population to share in America's abundance.

The Advisory Commission is convinced that the abolition of rural poverty in the United States is completely feasible. This Nation has the economic resources and technical know-how for doing this. The commission rejects the view that poverty in so rich a Nation is inevitable for any large group of its citizens.

The Advisory Commission's report is must reading for conservationists and others concerned about problems of the poor and how to improve their economic status, whether in the urban or rural areas.—JAMES F. HUGHES, *soil conservationist, Resource Development Division, SCS, Washington, D. C.*

Soil Testing and Plant Analysis. EDITED BY GLENN W. HARDY. 1967. *Soil Sci. Soc. Amer. Spec. Publ. 2.* Madison, Wis. In two parts:

Part I. Soil Testing. 157 pp., illus.; paper. \$2.00.

Part II. Plant Analysis. 114 pp., illus.; paper. \$2.00.

These special publications contain papers on soil testing and plant analysis that should be useful to people providing these services to the public. They should also bring understanding to the users of test results of how they can be used to influence crop production.

These papers provide a fairly good cross section on basic philosophy, methodology, and limitations of soil testing and plant analysis. They point up the need for additional research to improve laboratory methods and clarify the correlation of analysis with field situations for crop production.

The papers have been published previously; this collection brings them together for convenient reference. Each paper contains an exhaustive list of references on its subject.—LOUIS E. DERR, *Soil Survey Operations Division, SCS, Washington, D. C.*

The Christian Encounters Town and Country America. BY GILES C. EKOLA. 1967. *Concordia Publishing House, St. Louis, Mo.* 123 pp.; paper. \$1.25.

This little book seeks to relate the concerns of the church to modern life in "town and country," i.e., in nonmetropolitan areas. The author, being on the staff of the Lutheran Church in America, naturally expresses the theological viewpoint of that church. It is a philosophy familiar to many soil conservationists through the work of his associate, the Rev. E. W. Mueller, who for many years has served on the Soil Stewardship Advisory Committee of the National Association of Soil and Water Conservation Districts.

Chapters on community development, outdoor recreation, and especially the one on land and water, deal with subjects of primary concern to the Soil Conservation Service.—B. O.

Land Use Principles: A Reading and Discussion Guide. BY BEN OSBORN. 1968. *USDA Graduate School Press, Washington, D. C.* 39 pp. \$1.25.

This modest but excellent little treatise was developed for classes in the USDA Graduate School conducted in cooperation with the Audubon Naturalist Society, Washington, D. C. The treatise grew out of 9 years of field and class work

and is a model of its kind. Although designed primarily for the use of classes and study groups interested in the subject, the booklet has considerable value for the individual interested in improving his knowledge and concepts of land use.

The reading and discussion outline offers a series of subjects, each with suggested reading. The subjects deal with the esthetic and ethical, economic, political, social, ecological, and physical aspects of land use. There is consideration of urban and suburban uses, land use planning, watersheds, river basins, and finally, general principles.

A third section contains 70 principles summarizing in brief, clear statements the seminar and class discussions of the readings outlined, plus a selected list of definitions of conservation. The Guide is a *must* for anyone working in, or interested in, conservation as applied to the use of land.—W. R. VAN DERSAL, *deputy administrator for management, SCS.*

New publications

Conservation Plantings . . . Invite Birds to Your Home. 1968. USDA PA-840. 16-page illustrated folder in color. \$0.20. Bird's appetites lean toward "berried treasure," and their favorite berries are usually bright-hued and decorative. Their needs for shelter are met by hedges and other dense shrubbery that can fit handsomely in the backyard scene. Trees for songbird concerts and nest building also provide welcome shade and ornamentation for the human householder. The sylvan pool or pond built to serve the wildlife community also serves as a recreation area. Some of the plants listed in the folder are: Amur honeysuckle; crab-apple; firethorn; autumn olive; holly; silky gray-stemmed, redosier, and flowering dogwood; highbush blueberry; sumac; cherry; mountain-ash; hawthorn; red-cedar; American cranberrybush; bitter-sweet; tatarian honeysuckle; and Virginia creeper.

Let's Try It: Conserving Our Natural Resources. 1967. *Girl Scouts of the U.S.A., New York.* 23 pp. Lists and brief descriptions of girl-sized projects in conserving trees, wild flowers, water, wildlife, and soil; outdoor good turns; and other information useful to youth leaders.

Our Native Land. No date. *National Association of Manufacturers, New York.* 47 pp., illus. An updated version of "a basic handbook on conservation through wise use and management of natural resources" presents, from the viewpoint of American industry, the needs for conservation and reports on progress being made. It concludes with a statement of NAM policy on conservation and management of natural resources. Copies are available from the association.

Surface Drainage of Flatlands. BY IRWIN L. SAVESON. 1967. USDA Misc. Publ. 1062. 10 pp., illus. \$0.10. Two systems, the cut crowning system and the land-forming system, are recommended for surface drainage. The cut crowning system is used for the production of sugarcane, vegetable crops, and pasture; the precision land-forming system in the production of all crops except rice and pasture.

National Resources of Indiana. 1967. U.S. Dept. Interior. 52 pp., illus. \$0.45. Another in the series of beautifully illustrated booklets about the resources of each of the States. In addition to being an agricultural and industrial State, Indiana has water and power, mineral resources, fish and wildlife, and outdoor recreation.

Underwater and Floating-Leaved Plants of the United States and Canada. BY NEIL HOTCHKISS. 1967. U.S. Dept. Int. Resource Publ. 44. 124 pp., illus. \$0.65. An identification manual, illustrated with exceptionally clear line drawings, most of them life-size, of an important group of aquatic plants.

Zoning—an Aid to Community Resource Development. BY E. C. WEITZELL. 1967. USDA PA-814. 15 pp., illus. \$0.15. A guide to understanding the objectives and process of land use zoning and related functions of local government.

Soil surveys

Houston County, Alabama. BY DWIGHT M. HARRIS, JR. 1968. 72 pp., illus.; maps 4 inches to the mile (1:15,840). Soils surveyed by Dwight M. Harris, Jr., Glenn L. Hickman, John H. Hataway, and Lewis A. Dungan.

Dougherty County, Georgia. BY ROYCE G. MIDDLETON. 1968. 64 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by Royce G. Middleton, Marion M. Blevins, Ernest H. Smith, Russell O. Neal, and W. S. Carson.

Pike County, Mississippi. BY ALLEN C. MILBRANDT AND L. BROOKS HALE. 1968. 62 pp., illus.; maps 4 inches to the mile (1:15,840).

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From the Administrator:

The Meaning of Soil Stewardship



Soil Stewardship Week is a significant recognition of man's obligation to the natural and spiritual worlds of which he is a part.

I believe its importance will greatly increase as we become an ever more urban Nation. People living on the land are reminded of the importance of soil every day they work in the fields. Urban people need forceful formal reminders that their stake in good stewardship is just as vital.

Now, what does a soil steward believe, and how does he express that belief?

I think stewards recognize that land and water are not products of our labor, but gifts of God, under our stewardship. Anyone who uses these gifts has a moral responsibility to use them wisely. Men on the land, and in decision-making positions with respect to land use, have a direct and immediate responsibility. Good land use should be the natural result of sincere stewardship.

Men come to this recognition, and the resulting action, through different paths, depending on their experience. A farmer may see it through his work on the land; a philosopher through his reading; a theologian through his religious beliefs and experiences; an historian through his studies of past civilizations; an artist through his eyes.

The results will vary. A landowner will improve his land; a businessman will consider nondollar and conservation values in land use for himself and his community; a writer will reflect his perceptions in his work; a religious man will reflect it in his whole life.

Today, we know in large degree

the facts of how to keep our soil in good condition. The question is not knowledge but desire. Do we *desire* to keep our basic resources of soil and water in good condition? Do we desire it enough to pay the cost in money, in patient planning, in emotional restraints?

Do we, in short, have enough of a feeling of stewardship to look upon the soil as a loan to be passed on to another generation? Do we realize that the interest on this magnificent loan is the good use of the land while it is in our hands? Do we realize that this loan can be withdrawn for failure to pay the necessary interest, both literally and figuratively, of good land care?

These are matters of attitude and emotion. To a larger extent than many scientists wish to admit, they determine what we, as a Nation, will do with our land.

The spirit of responsible people at work on the land will lay the land to heart. The spirit will nurture man's concern for man. The spirit will be tested in our use of fields and streams. The spirit acknowledges that soil stewardship has no time limits. There is not a moment when a steward can step back and say of his handiwork: "This is complete." He knows that the contours must be plowed year after year . . . the terraces kept in repair . . . the crops rotated . . . the watershed dams inspected.

The spirit of a responsible people does not disappear as we approach the city limits. The spirit is shown by the Nation's attitude toward conservation. It is shown in the halls of Congress . . . in suburban planning councils . . . in the voting booth. More fundamentally, it is shown in our sense of personal

responsibility for soil stewardship.

The spirit is the animator behind our actions.

What then, is the reward of the steward?

The reward is a sense of responsible contribution to the future, a sense of working with nature as it moves in cycles. The steward knows the planted seed must precede the harvest. The summer-built terraces must precede the spring protection from storms. The autumn corn must precede the winter feed.

The reward of the steward is seen in the beauty of the countryside and the strengthening of his community.

Finally, the reward of the steward is in self-respect; a feeling he has given his time and talent to something worthwhile.

Three-fourths of our land is owned or operated by private citizens, so they are the primary stewards. Since the bounty of the land is shared by rural and urban people alike, the responsibility for the land falls not only on farmers and ranchers who make up less than 7 percent of our population, but also on the 93 percent in towns and cities. As this urban trend continues, more and more of the stewardship responsibility must shift from the man behind the tractor to the man behind the desk.

We have, in our history as Americans, made giant strides across the land. Now we must retrace our steps and look at the land with new eyes—the eyes of stewardship, in which use and responsibility are seen as the unbreakable ties that bind us to nature.

We will serve best what we love the most, for the desire to serve is founded on love. The desire to serve has made many of us dedicate ourselves more fully to God, to fellow men, and to the care of the natural resources we have inherited. There is a kinship here, for in service to one, we find reason for service to the others.

D. A. WILLIAMS



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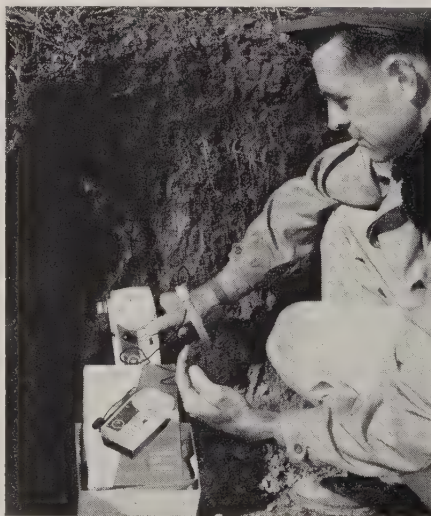


Then— and Now in soil surveys

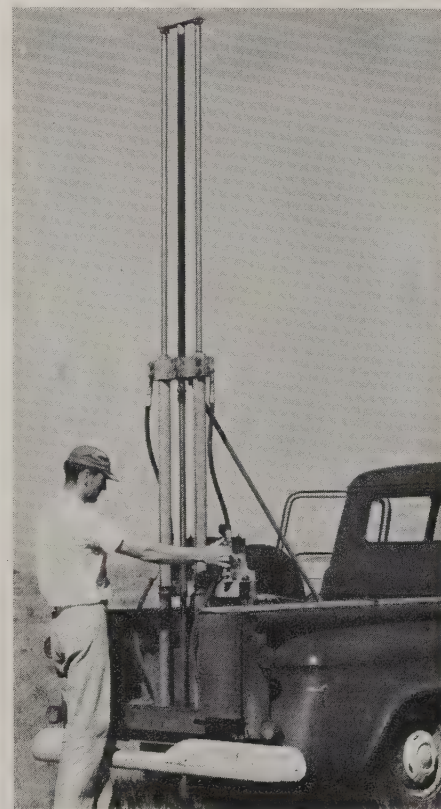
When soil scientists began to make soil surveys, they borrowed from the field methods of geology and the laboratory methods of chemistry. Since then, soil science has developed its own quantitative methods. Modern equipment and technology have made great changes in the work of the soil scientists in the field.

Then (in 1910, above), the field equipment consisted of a simple soil auger, a buggy fitted with an odometer to measure distances, and a planetable on which the fieldman plotted soil boundaries and other physical features of the landscape that users can see.

Today, the soil scientist uses motor vehicles for transport, me-



chanical equipment for digging (power soil sampler, far right), portable scientific equipment for some determinations formerly possible only in the laboratory (soil acidity, left), and good airphotos on which to plot soil boundaries with great precision. ♦



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CONSERVATION FARMING WITH BIG EQUIPMENT

Parallel terraces Minimum tillage Stubble mulching

The Homer C. Mitchell Tree Farm

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Parallel terraces in the Garza County Soil and Water Conservation District, Tex. See story on back page.

Modern . . .

Soil conservation has its modern technology, too.

Stepped-up production, made possible by fabulous advances in equipment and methods, too often brings with it stepped-up soil depletion.

But it need not. Chemicals and big machines are but tools with which the operator does his will.

If the farmer's will looks to the future, and if it is joined by understanding of sound principles of resource use, modern farming can also be conservation farming.

In our lead article this month, Engineering Director "Chet" Francis reviews some of the ways conservation technology is being shaped to the realities of modern farming.

Terraces: Conservation Engineer Tom Cowan tells (p. 248) how new type parallel terraces and modified equipment make soil and water conservation feasible in big, fast farming on the High Plains of Texas.

Tillage: Less, not more, tillage is another conservation answer to powerful machines and chemicals.

Sod- and mulch-planting of corn, as described by a team of North Carolina conservationists (p. 246), depends on a combination of chemical fertilizers and herbicides and modified equipment.

The spreading practice of stubble mulching (p. 255), too, is made feasible by modern power and plows.

soil conservation

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The great changes in farming methods that have come about in the past decade are bringing equally great changes in conservation concepts and methods.

Probably the most spectacular change has been the development and use of larger, faster farming equipment. The high-horsepower tractor with six-, eight-, or 12-row equipment; the six- and eight-bottom plow; the combine with six- or eight-row corn headers; and the multirow, mechanical cotton picker are now commonplace.

The use of big, fast equipment, coupled with new and better seed, fertilizer, insecticides, and herbicides, enables the American farmer to produce efficiently the food and fiber needed by a growing world population.

Effects on conservation

The basic principles of conservation farming developed through research and experience are still valid with this new equipment, but changes in their application are necessary.

The large equipment demands large fields for efficient operation. Old field fences that have stood for generations are coming down. In many cases, farms are being combined to make larger operating units.

More and deeper fall plowing, possible with large equipment, leaves bare soil exposed to erosion for longer periods of time. Row cropping is becoming more intensive, leading in many instances

to a continuous single cash crop, such as corn. Contrary to past thinking about rotations, new soil management systems are being devised to give good conservation results with modern farming methods.

Today's farmer is extremely sensitive to any system that slows down his operations. He avoids field layouts that add extra point rows, that cause more turning, or reduce operation speed. He frowns on arrangements that reduce the size of fields, that tend to isolate fields, or that make access and travel to and from fields more difficult.

A few computations make it easy to understand the importance of rapid movement of field equipment. An eight-row cultivator traveling at 2.5 miles an hour plows 6.6 acres an hour, while one traveling at 5.0 miles an hour plows 13.2 acres. An eight-bottom plow at 2.0 miles an hour covers 2.2 acres while one traveling 5 miles an hour covers 5.5 acres. An eight-row combine traveling 2.0 miles an hour can harvest 2.6 acres while one traveling at 3.5 miles an hour will harvest 4.6 acres. Speed and ease of operation play a big part in acceptance of a modern conservation system.

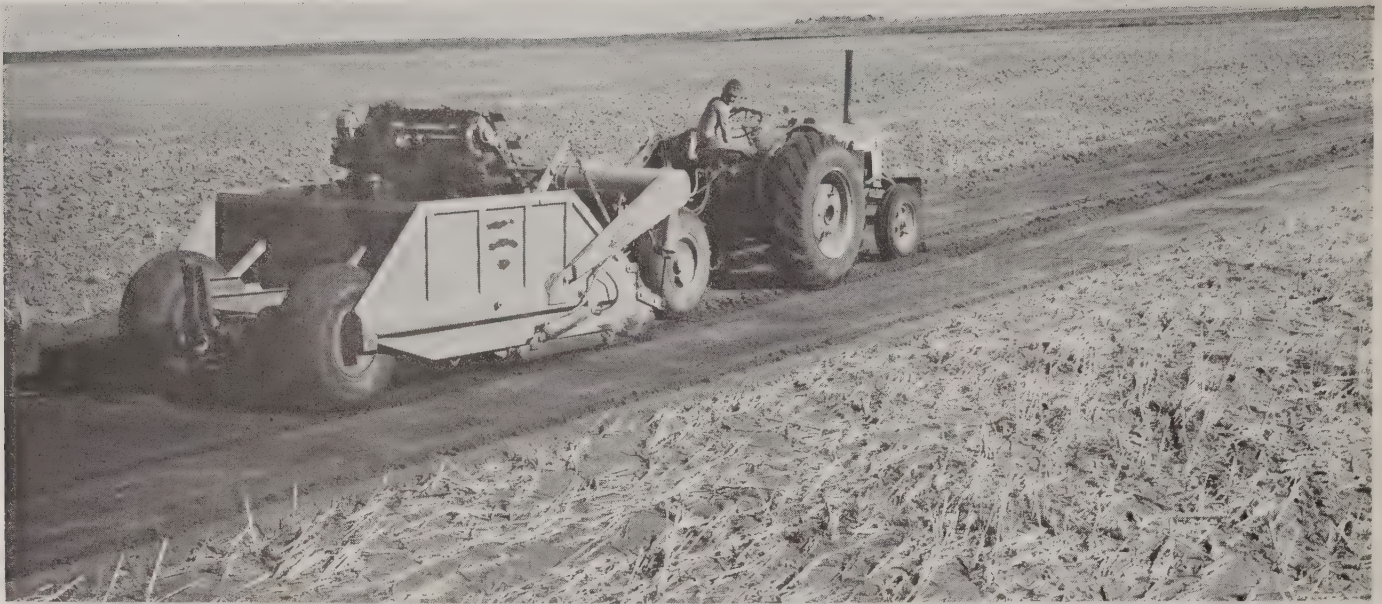
New conservation methods

Conservation methods are changing to keep pace with the trends in modern equipment. Much of the land in cultivation is steep enough to require terraces for erosion con-

Fitting conservation to today's farming equipment

By C. J. Francis

Director, Engineering Division, SCS



Modern land-leveling equipment eliminates high and low spots in the field.

trol. Parallel terraces are at least a partial answer to the problem of conservation farming with big equipment on such fields. The terraces are fitted to the topography so that they are an equal distance apart throughout their length. The spacing between terraces is selected to fit the type of equipment used, allowing for an even number of rows between terraces and reducing the number of odd row areas. Point rows, causing extra turning in planting, cultivating, and harvesting, are reduced or eliminated.

Installation of parallel terrace systems has been simplified by the use of modern, heavy earthmoving equipment that can do necessary smoothing, cutting, and filling, to install a workable terrace system.

The size and shape of the terrace ridge also is changing. The farming equipment to be used, rather than the water-carrying capacity of the terrace, becomes the determining factor. On moderately sloping fields, the terrace ridge is made broad enough that the side slopes will accommodate the full width

of the equipment to be used. The entire terrace is farmed. On steeper fields the front slope of the terrace may be made broad enough to accommodate the equipment to be used, while the downhill or back-slope is made steep and is seeded to grass. Only the front slope is cultivated.

The grassed waterway, a necessary part of most upland water-disposal systems, is changing shape also. Building waterways wider and with flatter side slopes provides greater ease of crossing with large harvesting equipment, such as self-propelled combines, corn pickers, cotton harvesters, and trailers.

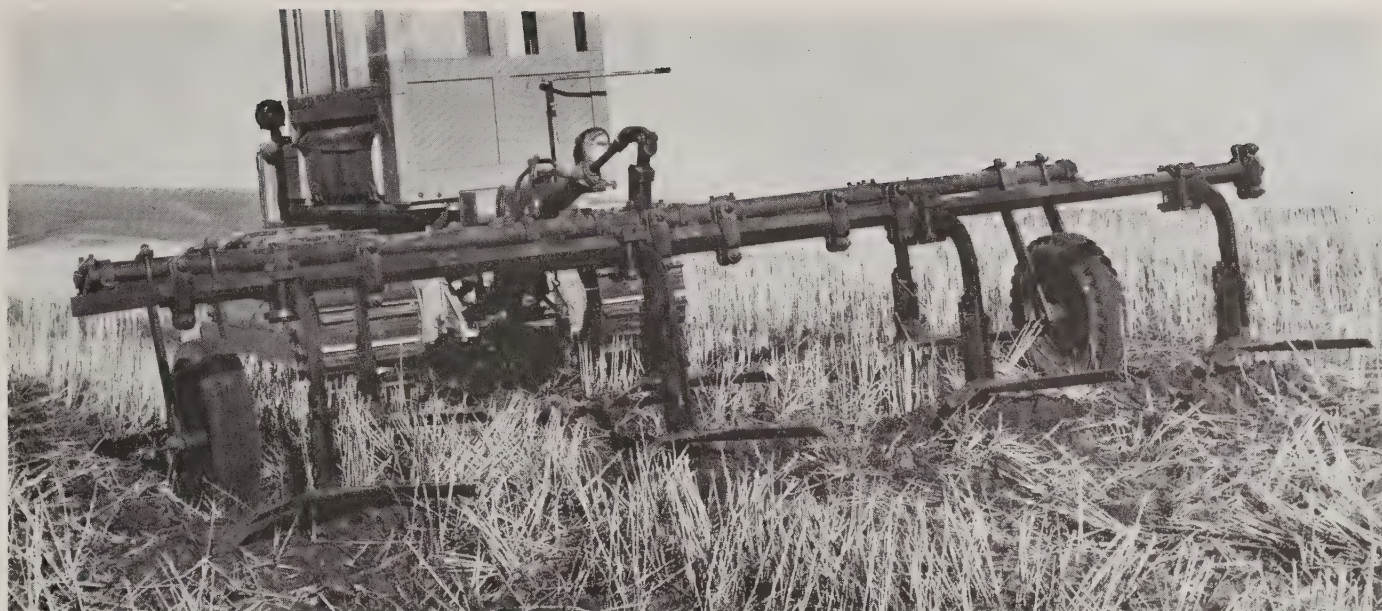
Special equipment plants corn in ryegrass cover and applies fertilizer in a single trip.



Underground drainage

There is a growing trend toward replacement of waterways with a buried pipe system to carry the runoff water from parallel terrace systems. The pipe in each case is of a size to carry the designed flow. An individual inlet is provided for each terrace in the system, placed in relation to the ridge to cause the least interference with operation of large farming equipment.

Access roads to and through each field are increasingly important. They must be planned as an integral part of a conservation system



Large sweep plows leave residues on the soil surface to control erosion and conserve moisture.

to provide easy access to the field, to serve as turning areas, and for use in hauling harvested crops.

Leveling and smoothing of farmland is becoming increasingly important, not only for irrigated fields and for land requiring surface drainage but for dry land as well.

Leveling or smoothing of sloping dry land may be necessary to permit installation of the best water-control system, such as parallel terraces. Elimination of high and low spots promotes uniform drying of the soil following rains or irrigation, gives uniform conditions for cultivating, and provides easier and quicker access for harvesting. These things become increasingly important as equipment becomes larger.

Minimum tillage

More intensive farming and greater reliance on continuous single cash crops can increase the erosion hazards. Careful planning for best use of crop residue is essential to reduce exposing bare soil and to maintain soil organic matter and soil tilth. Reducing the number of plowing operations and doing tillage operations in a manner to leave crop residue in or on the surface can greatly reduce the erosion hazard.

In some parts of the Southeast, corn and soybeans are planted directly in a sod cover. The sod, usually fescue or ryegrass, is killed with a herbicide. A special planter opens a narrow trench in the dead sod and puts down fertilizer and seed with little disturbance of the cover. Need for cultivation is eliminated or reduced by use of herbicides. The sod residue reduces soil temperatures in summer, acts as a soil mulch to reduce moisture losses, and provides excellent protection for the soil from erosion.

In other parts of the country, plowing, planting, and cultivating are done with modern equipment in a way to leave large amounts of residues from cash crops, such as corn, on the surface to provide similar protection.

Modern equipment is now available for growing crops with a minimum of tillage. The soil is worked and fertilized, herbicides are applied, and seed is planted in one trip over the field. Minimum tillage reduces soil compaction, aids increased water infiltration, and reduces erosion.

As farming equipment grows larger and more complex, conservation systems are being adapted to meet the changing needs. ♦

Sod-planted corn matures a crop with the soil surface still densely covered.





Progress in minimum tillage

North Carolina farmers adapt machinery and methods to gain advantages of sod and mulch planting

By W. W. Stevens, C. C. Abernathy, and J. E. Pollock

State soil conservationist and conservation agronomists, SCS, Raleigh, N. C.

Many North Carolina farmers and others interested in soil and water conservation are coming to prefer sod or mulch planting to conventional tillage where these minimum tillage operations can be adapted to their cropping systems.

Sod or mulch planting leaves a protective cover of living sod or residue on the soil surface during the growing season. This conserves moisture, increases water infiltration, reduces soil loss from water and wind, reduces soil compaction, and reduces cost of production.

A trial first

Equipment and techniques should be tested on a small scale,

however, before large scale plantings are attempted. The results are variable.

Sod planting refers to planting corn and similar crops in perennial sods. Mulch planting refers to the same crop planted in residue and stubble of annual crops. The same equipment is generally used for both types of planting.

Satisfactory yields of corn and sorghum for grain and silage can be produced in perennial cool-season sod without destroying the sod. Trials indicate that turning annual plant residue into the soil is not necessary to make satisfactory corn yields. Furthermore, sod plant-

ing of corn is much better in cool-season perennial sods that have at least a partial dormant period when corn is making its maximum growth. Plants like fescue, orchardgrass, and bluegrass meet this requirement and can be readily suppressed with herbicides. Perennial grasses should be mowed or grazed closely before planting corn by this method.

Plants like bermudagrass, dallisgrass, and johnsongrass have the same peak growth period as corn. They give serious competition to sod-planted crops and are hard to suppress or kill with herbicides without injury to the planted crop.

Residue or stubble from corn, soybeans, and small grains offer little or no competition to the mulch-planted crops. Herbicides, however, need to be used to control the annual summer grasses and weeds.

Sod planting in North Carolina

In North Carolina the acreage of corn planted in perennial sod has rapidly increased, as these figures show:

Production costs for sod-planted corn are \$10 to \$14 an acre less than those for conventionally planted corn. Variation in cost is

	1962	1963	1964	1965	1966	1967
Number of plantings	1	3	16	57	69	90
Acres planted	10	30	69	290	722	1,000
Counties with plantings	1	3	14	38	43	49



Soil loss was near zero, far left, and corn came up within a week when planted in a cool-season perennial grass. Herbicides suppressed sod and annual grasses. Above, corn planted in rye treated with a herbicide and fertilizer but with no land preparation. On right, sod-planted corn grows in recovered fescue for third year after producing 20 tons of silage an acre the first 2 years.



due to different methods of planting, fertilizing, and use of herbicides. Much of the profit of growing corn in North Carolina may result from this saving in production costs.

Any sturdy equipment that will plant at the proper depth, cover properly, and firm soil around the seed is satisfactory for sod or mulch planting.

Farmers have generally modified equipment they have on their farms; a few have designed and built their own equipment.

The modifications usually consist of adding a chisel, bull tongue, or point 1 to 2 inches wide to a shank or tine and attaching this to a tool bar to prepare a planting area in front of a conventional planter. The shanks or tines on field cultivators or similar equipment are often rearranged to prepare the planting area at the desired row width. Most farmers use a rolling coultter in front of these openers in heavy sod or residue.

Some farmers use subsoil points, cultivator sweeps, grassland drills or sod seeders, or power-driven, heavy-duty rotary tillers. All of the blades are removed except for two or three at the desired row width.

Some farmers use a rolling coultter or subsoil points ahead of this equipment.

Some farmers use a seed press wheel in the planting furrow just behind the seed boot and in front of the conventional press wheel. They report excellent stands of crops.

In one operation

Some farmers prepare the planting area, apply the fertilizer, and plant the seed in one operation. Others prepare the area for planting, apply fertilizer, and plant in separate operations. The fertilizer is applied in the drill, in bands, or broadcast with no significant differences in yield.

Experience, observations, and research point to several conclusions about sod and mulch planting:

(1) Satisfactory results depend

upon adequate moisture; proper use of fertilizer, usually including a sidedressing of nitrogen; proper use of herbicides; and proper planting procedures.

(2) Some land unsuited for row-crop production under conventional methods can be used for annual grain and silage crops with sod planting.

(3) Sod planting in perennials is an excellent conservation measure, but it also presents new problems such as control of insects, diseases, and nematodes.

Successful sod and mulch plantings have been made in all regions of the State. They have been successful, both in production and conservation, on many soil types. There is no known reason why they cannot be successful on any good soil. ♦



A flexible tool bar allows this eight-row planter to plant four rows on the side of a parallel terrace while planting four rows on the terrace interval.

Changing terrace styles adapt to modern equipment

By Thomas E. Cowan

Agricultural engineer, SCS, Lubbock, Tex.

On the Texas High Plains, large-scale farming has many of the answers to labor shortages and high operating costs. These answers, however, may raise new questions on applying soil and water conservation measures. Four-row machinery is being replaced by six-, eight-, and even 12-row equipment, and this calls for a reevaluation of terracing methods among other conservation measures.

Standard terrace systems that followed the natural slope of the land were satisfactory for four-row farming. Rows were laid out parallel to terraces with the point rows placed near the center of the intervals or at the low side of the terraces. The turning space required for farming the point rows was not large, but as equipment increased in size, so did the size of the turnrows. With the larger equipment, too much land had to be left out of crops, and turning was difficult.

Parallel terraces

These problems are partially solved by constructing parallel terraces that eliminate or reduce point rows. This is done by landforming

along the terraces and in the intervals between them. A minimum number of irregular shaped terrace intervals result. Irregular intervals can be planted to drilled crops or grass, or farmed with smaller equipment.

Fitting large equipment to the terrace ridge is still a problem.

Ridge type terraces that are common on the High Plains are 12 inches or more high and 20 to 25 feet wide. Since the standard furrow width is 40 inches, or $3\frac{1}{3}$ feet, four-row equipment is about 13 feet wide. This is close enough to the width of one side of the terrace ridge to permit the terrace to be worked without any problems. But six-row equipment is about 20 feet wide, or nearly as wide as the entire terrace ridge. Farming one side of a terrace at a time places two rows off the terrace ridge.

A logical question is why not make the terrace ridges wider? A

Terrace spacing is important where the land is bedded with a five-bottom middle buster, then planted and cultivated with six-row equipment.



little thought shows that this would be impractical. For six-row equipment, a 40-foot base width would be needed. Such terraces would cover too much of the total field area; on some slopes, half the field area would be in terraces.

Two sizes of equipment

The usual solution is to farm the area between terraces with six- and eight-row equipment, and then use four-row equipment on the terraces, or leave the terrace ridges out of row-crop production. This is convenient where crop acreage restrictions are being observed.

But keeping a small tractor just to farm terraces is not the final answer. Some farmers are modifying their large equipment to farm the terrace ridge. One approach is to break the tool bar in the center. An eight-row hookup will permit operating four bottoms on one side of the terrace ridge and the other four in the terrace interval. There is still the problem of designing machinery that can be picked up for turning and also maintaining strength and rigidity with the flexible tool bar.

Terrace spacing is another point that needs consideration. The old terrace vertical interval formula is still important for conserving soil and water, but the number or rows between terraces must be adjusted to fit farming equipment. If the field is bedded with a five-row lister, then planted and cultivated with six-row equipment, the number of rows per terrace interval must be considered carefully. If six-row equipment is to be used in the terrace interval and four-row equipment on the terrace ridge, a different terrace spacing will be needed. The terrace spacing on all fields must be worked out for the equipment and farming procedures that each farmer plans to use on his farm.

In this way, conservation measures will stay in harmony with progressive farming methods and changing equipment. ♦

A report from Tunisia . . .

SCS conservationist finds water and grass regarded as gifts from God

Durwood E. Ball went back to his regular job as range conservationist for SCS at Uvalde, Tex., November 1967, after 2 years in Tunisia. Under a Participating Agency Service Agreement (PASA) among USDA, AID, and the Tunisian Government, Ball was range conservationist for the Oued Marguellil Watershed Project.

In Tunisia he helped establish a 600-acre demonstration pasture and the El Grine Nursery, a 247-acre seed production center. He directed the planting of 54 species of grasses and legumes from which plants will be selected and produced for a range management program he outlined for the project area.

The nursery is irrigated and ready to contribute valuable seed

to the local farmers.

What was *their* reaction?

Ball met the people, saw many reactions, and came home feeling optimistic of the nursery's success.

In Tunisia, he said he felt more optimistic in the winter, when most of the 8 to 15-inch annual rainfall came to the region between Maktar and Kairouan. In the summer, during the "sirocco," or desert wind, he understood why the people there revered water as "God given."

Save the water

They would plug the drawdown spillway on a watershed dam, not understanding that the pipe was needed during the rainy season to keep a constant water level behind the dam. At first, it seemed to Ball, the fear that water would

A native vetch is a center of attention for Durwood Ball at El Grine Nursery where 54 species of legumes and grasses were tested for possible use in local range improvement.



escape and go to waste made some Tunisians so uncomfortable they felt compelled to plug the pipe with rocks.

Finally, a nearby farmer indicated his change in thinking by tipping off the SCS people when he knew someone had stopped the spillway.

The first to come when water gathered behind a completed dam, he recalled, were the kids. They jumped in and splashed joyously. Then the women came with their water jugs to fill and clothes to wash. Finally, the animals—donkeys, sheep, cows, and camels—came to drink.

Grass too, is "God given," he learned from the Tunisians. It grows when there is moisture, turns brown and dies when it's dry, and miraculously returns again with the rain.

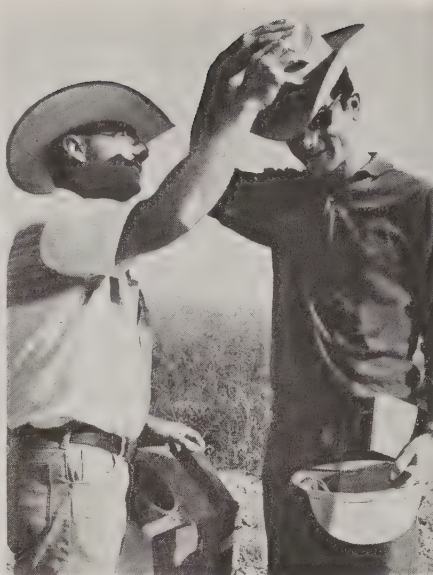
Use the grass

Before men trained in plant materials work came to Tunisia, the native herdsman did not regard pasture as a crop but that grass was meant to be used when and where it was offered. They were not allowed to graze wheat and other grain.

As head of range and plant materials work in the Oued Marguellil Watershed Project, Ball's job was to convince farmers that grass was a crop—that plants could be selected and planted to improve grazing on their dry rangeland.

When an irrigation well was dug for the El Grine Nursery, people came from nearby villages to see the "new water." They filled their water jugs and watered their donkeys.

Along with the seed-producing plants came the weeds. The nursery was not equipped with modern herbicides to spray the 100 hectare (247-acre) nursery. But the women from the villages solved the problem. They came and pulled the weeds, stacked them in piles, and carried them home to feed their livestock.



SCS Range Conservationist Durwood Ball (left) tops off his Tunisian assignment with the gift of a Texas hat to Mohamed Gahrbi, a trainee at the seed production center.

On weekends Ball traveled with his wife and four children to Tunis, where he wrote reports and met with Government officials.

As he watched the donkeys drink from the fountain in the street and the sheep graze on his front lawn, he realized the value of exposing his family to this ancient culture. His children learned a new language, tasted different foods, and discovered people as people without culture-bound prejudice.

Clash of ideas

Tunisia is a traditional country clashing against an influx of modern ideas. Ball, as a proponent of the modern, said he was accepted with reservation in some cases and openly in others.

At a rug auction in Tunis, he won the bid on a rug when he raised the bid 40 cents. When Ball tried to pick up the rug, the rug carrier withheld it, insisting Ball was not a merchant, but a tourist. There is another market for tourists with tourists' prices. Finally, the woman who made the rug approved the deal.

While in the field, Ball saw a large caravan pitching tents for the

evening. It was moving sheep from summer grazing in the mountains down to the plains for the winter. Ball was warmly greeted by the chief and allowed to take pictures throughout the camp. He photographed a woman holding a baby which clearly showed the scratch marks where the child was bled for fever. Arabic authorities rarely allow their women to be photographed, much less with a baby.

Ball thanked the chief and invited him to stop again in the spring when he returned to the mountains. The chief's reply was characteristic: "Inshallah" (God willing).

Farming methods that have supported centuries of survival are hard to change, Ball discovered. The farmer who has plowed with a camel for many years finds it hard to realize that tractors need maintenance and repair.

A long walk to work

Although workers saw little more than futility in hurrying, reported Ball, each morning they walked 10 miles from their village to the camp at Maktar and 3 more miles to work on a nearby project. In the evening, they walked the 13 miles again to reach their village.

Many Tunisians are willing to work for a daily wage of 60 cents and 3 pounds of flour. There is a shortage of jobs. The shiek, or head of the community, selects the workers from the many who apply.

Tunisia is a relatively progressive nation, and the people appreciate the chance to learn. The workers gave a party for Ball at the center before he left. It was a hearty affair with barbecued sheep, bread and wine, and the singing of many Tunisian songs.

Ball gave his top Tunisian trainee at the center a Texas hat. Mohamed Gahrbi was overwhelmed. The man who had the know-how to grow new grass on the parched plains had given him a prestigious symbol that few Tunisians would fail to envy. ♦



A more-than-man-sized plow does a man-sized job of breaking up hardpans and subsoil on a California irrigated farm.

Slip plows used to break up hardpans in irrigated soils

Landowners in Imperial and Coachella valleys in California are using slip plows to improve soil permeability in fields with plow-soles, hardpans, and stratified soils. Slip plowing increases soil drainage and aids in the removal of harmful salts from irrigated cropland.

The slip plow is a modification of the deep subsoiler and consists, basically, of a single heavy-shanked chisel, capable of working to depths of 6 feet. To this is attached a reinforced flat plate, 10 to 14 inches wide and 12 to 14 feet long.

The plate, oriented with its long dimension in the direction of travel, is attached to the pointed end of the chisel shank and extends upward and backward at an angle of 60 to 70 degrees. The upper end of the flat plate has a delta wing flare to push loose soil away from the space opened by the plate.

The upper end rides near the ground surface when in operation, and a stabilizer chain or metal bar holds the upper end of the attachment in position. The angle of the

plate can be controlled by the length of the stabilizer. Dimensions vary among the numerous home-made implements as well as custom and commercial models in use.

As the slip plow moves through the soil it breaks up the stratification by lifting, rolling, and mixing the soil in the disturbed area.

Slip plowing is done on 4- or 8-foot intervals across the field. The job requires track-type tractors of about 200 drawbar horsepower. Depending on soil type and depth of plowing, they are used singly or in tandem.

After slip plowing, leach water is applied to move salts out of the soil and into the drainage system. The practice is not recommended unless there is adequate provision for drainage.

Costs average \$16 an acre for plowing on 8-foot intervals, and \$32 an acre on 4-foot intervals.

Russell Rummonds, president of the Coachella Valley Soil Conservation District, and his brother, Ray, one of the directors of the Coa-

chella Valley County Water District, used slip plowing on a 40-acre field of stratified Indio silt loam at their farm in Thermal.

Soil samples tested after leaching with 2 feet of water showed that salts in the top 24 inches of soil were reduced to electrical conductivity readings of 1.6 to 4.2 millimhos per cubic centimeter. Readings of 7 to 35 millimhos were found in similar samples taken from the nonplowed areas 4 feet away. The field was reclaimed after slip plowing the undisturbed area and leaching with an additional 3 acre-feet of water per acre. —WALTER A. BUNTER, JR., AND JACK F. SMITH, *work unit conservationists, SCS, Coachella and El Centro, Calif.* ♦

GRASSED WATERWAYS

Grassed waterways are broad gently sloping channels that carry water slowly and safely off the field. They are covered with a thick grass that keeps the water from cutting into the soil. ♦

The Homer C. Mitchell Tree Farm

By Ed Kerr

Public Law Land Review Commission, Washington, D. C.

Many of the precepts of the late SCS woodland conservationist, Homer C. Mitchell, are demonstrated on the memorial forest near Flatwoods, La., dedicated to his memory.

The Homer C. Mitchell Tree Farm, an impressive 90,000-acre reforestation project of T. L. James & Company, was established largely under the direction of Don Burkhalter, an early protege of Mitchell when both were employed by the Soil Conservation Service.

Now 10 years old, the young trees are large enough for application of the "D plus X" formula of spacing which was one of Mitchell's main contributions to the art of forest management. This simple guide to improvement cutting relates the diameter of trees in the stand to the space required for proper growth.

It is one of the four steps in the

principles of woodland conservation that Mitchell advocated. The total concept is to:

- (1) Prevent wildfires.
- (2) Plant areas that won't become naturally stocked within 2 years.
- (3) Thin according to plan. Leave the best trees to grow, spaced at a distance determined by the diameter of the trees plus a constant appropriate to each species (D+6 for Southern pines).
- (4) Harvest crop trees at the rate of 1 per acre per year in addition to the trees cut in thinning, opening areas at least 100 feet across.

The James tract is probably the largest in the world managed according to the formula.

It was about 10 years ago that the James Company embarked on a reforestation project that promised more hurdles than an Olympic arena. Namely:

(1) The land is situated in five central Louisiana parishes which once bore the worst forest-fire record in the Nation. Local residents burned the cutover pinelands every year to "green up" the grass before spring.

(2) The 90,000-acre tract was almost devoid of trees, yet the company had signed a 99-year lease agreement with the owner which called for payments of more than \$1 an acre a year, plus taxes and other expenses. This meant the company had to reforest not only skillfully but fast!

(3) The only possible way to reforest an area of that size in limited

Company employee covers trash at a designated waste-disposal area on the reforestation project.





Hunters and other recreationists are invited to see the reforested land.

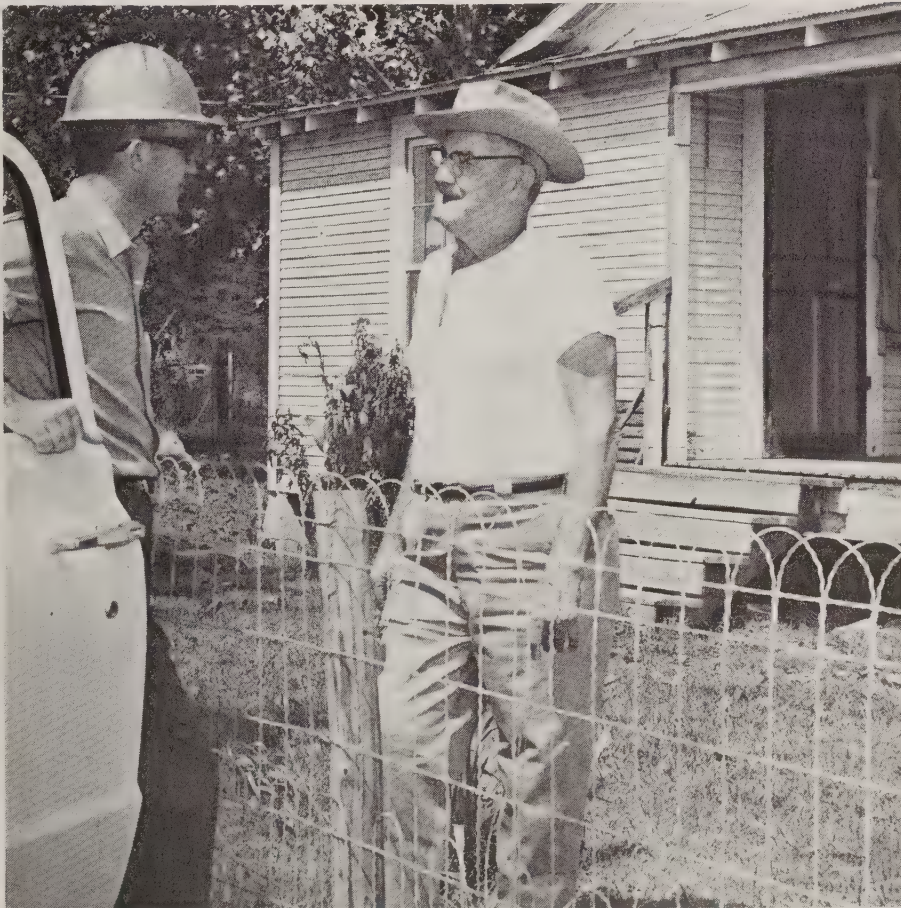
time was direct-seeding; that is, dropping pine seed directly onto prepared ground, instead of employing the time-honored method of transplanting 1-year-old nursery stock. Direct-seeding techniques, developed by researchers of the U. S. Forest Service 3 years before, had been tested on small, pilot-plant acreages but never before on large projects. Would it work?

(4) In a community of rural residents accustomed to setting range fires and raising wild hogs and open-range cattle, reforestation can mean a revolution in a way of life. It can also mean counter-revolution.

Today, the T. L. James tract is a forest 40 feet tall—one of the most fabulous success stories in the history of Southern forestry. Burkhalter, forest manager for the company, calls it a “monument to coordinated public service.”

The forest-fire record on James' holdings, which have been phenomenally low, is attributed to cooperation by the Louisiana Forestry Commission and community goodwill. Before the James project was begun, the entire area burned over every other year. Since that time, fire loss has been cut to an average of 200 acres a year, or less than 0.2 percent of the total acreage. This is one-fourth the Southern average.

When Burkhalter first gathered his employees together, preparatory to the first-year reforestation effort,



A company forester has a neighborly visit with a resident of the area.

he explained his philosophy of community relations very clearly:

"Being a good neighbor means just that. If one of our neighbors needs to go to a hospital, take him there in a company vehicle and your time will be counted as company time. If I hear that you don't take him, you'll be dismissed."

As a result, James employees, most of whom were chosen from the local area as a matter of company policy, have become well-known as good neighbors in the Flatwoods community.

"Employees representing most of the communities within the property boundaries have been local goodwill ambassadors," according to Bill Evans, chief forester for the James tract. "They have no doubt sold the reforestation program to some individuals who could not have been favorably influenced by anyone else."

Immediately upon leasing the property, Burkhalter placed the entire acreage under soil conservation district agreement and availed himself of the services open to him.

"We wanted technical assistance, and we got it from SCS personnel through the district," he pointed out. "Soil scientists were requested to locate a suitable site for a community lake to provide needed recreational facilities in the way of swimming, boating, camping, and fishing for the vast area. They found a 54-acre site, and engineers prepared the necessary plans and specifications for the dam and supervised its construction. Biologists made recommendations for stocking and fertilizing the lake, and we followed their advice precisely."

This was only the beginning. Cattlemen soon found out that the company policy was not to restrict use of the range to them, although the company would not tolerate wildfires.

Garbage disposal is always a problem in rural areas. Knowing this, the company dug garbage pits and maintained them for all local communities.

A program was begun to grant

subleases to high schools for 40-acre school forests.

Building sites were granted to church congregations.

A wildlife propagation program was developed to increase quail, deer, wild turkey, and squirrels, with the cooperation of the Louisiana Wildlife and Fisheries Commission. The commission also provided fingerlings for stocking the community lake. Food and cover plants were grown in the company's nursery at Ruston to stock the acreage.

From a study of SCS soil maps, the company selected a block of land to be planted in soybeans. This crop will provide a source of income while the young trees are growing large enough for the first harvest.

"Here the county agents and Extension Service specialists from Louisiana State University were called upon for assistance," Burkhalter said. "They collected soil samples, tested them, and made specific recommendations on fertilizer and trace element requirements, coupled with cultural practices to be followed."

Burkhalter pays special tribute to the U. S. Forest Service "without whose know-how and assistance in direct-seeding the project would not have been possible in the first place." With the help and advice of Bill Mann, project leader, and the staff of the Alexandria Forestry Center at Pineville, La., the entire acreage was reforested successfully in 3 years.

Burkhalter is managing the entire 90,000 acres according to the late conservationist's principles. He has completed steps one (protection) and two (planting). Soon he will begin steps three and four. Young trees will be thinned to the D+6 spacing every 6 years. The harvesting will not be the one crop tree per acre per year that Mitchell prescribed as a simple method of area control for small timber tracts but will still follow his principle of systematically harvesting and replanting a definite area each year.

The planning for this phase of the operation is not yet final. A 35-year rotation is being considered, which would require the annual harvesting of about 2,500 acres of timber.

And last, but not least, Burkhalter attributes the success of the James project to Homer Mitchell, for whom the tree farm is named. ♦

Workers trained for jobs created by RC&D Project

More than 160 jobless Oklahomans—many of them Cherokee Indians—are being trained for new jobs being created in the Cherokee Hills Resource Conservation and Development Project.

In a special \$300,000 training program funded by the Labor Department, the people are learning attitudes and skills needed for jobs in operating and repairing construction equipment, welding, doing land-improvement work, and other specialized jobs, from typing to poultry processing. The training grant will grow to \$1.5 million as the program proves its worth and other courses are added.

It is a pioneering cooperative effort by USDA, Labor, and the Department of Health, Education, and Welfare. Aim is to ready local citizens for new jobs in rural America as they're brought about by efforts such as RC&D projects.

An early measure in the Cherokee Hills Project proved that training works. In the Bull Hollow Training Course, 15 unemployed Cherokee Indians learned how to operate construction equipment. On the same day that they "graduated," 14 of them got jobs.

More and more trained workers will be needed as the RC&D Project moves along. The 23 measures completed last year alone are expected to bring 500 man-years of continuing annual employment, and to increase gross income in the area by \$3.5 million. ♦



The three-blade flexible sweep is favored for use on terraced land.

Stubble mulching moves east to play dual role in wind and water erosion control

By Earl J. Bondy

Conservation agronomist, SCS, Salina, Kans.

Stubble mulching is taking on new momentum as a soil conservation practice of wide application. Long ago it proved effective in controlling wind erosion on cropland in the western Great Plains and Far West. Now it is moving east and proving equally useful in dealing with water erosion.

Wheat growers in central Kansas, along the eastern edge of the Great Plains, are successfully adapting the practice to play a dual role in their conservation programs.

These farmers generally grow continuous wheat, without a year of fallow between crops, because they expect more precipitation than growers farther west do. Until 10 to 15 years ago, most central Kansas wheat farmers grew sweet clover about 1 year in 4 on their wheatland. The sweet clover provided nitrogen, organic matter, and good soil tilth. It helped hold moisture, aerate the soil, and control soil erosion.

But times have changed. Few wheat growers in central Kansas now raise a legume crop. They moved rapidly toward more intensive row-crop farming when they found that nitrogen could be obtained at less cost from chemical fertilizers. Wheat acreage allotments also encourage intensive cropping.

Take the case of Matthew Heigle, Clay County, who has terraced all of his cropland and farms on the contour. These measures simply weren't doing the job well enough with his farming program of wheat, grain sorghum, and soybeans.

Central Kansas receives an average of 27 to 30 inches of precipitation a year, compared to 20 inches and less in western counties. The rainfall is unevenly distributed during the year and sometimes causes severe water erosion. In addition, the upland soil blows readily in dry weather.

"Several years ago, I decided to

try stubble mulching. Today, I am a strong believer in it. It has filled the gap in wind- and water-erosion control and moisture conservation," he said.

Heigle's wheat yields at least as much as when he used a mold-board plow. As soon as wheat is harvested, he goes over the stubble with a 7½-foot blade sweep that undercuts the stubble and weeds at a depth of 4 inches to get a good weed kill. He usually repeats the operation four times before planting wheat. He varies the depth of undercutting to avoid forming a hardpan. Each plowing reduces stubble on the surface by about 10 percent. When he has too much stubble left, he disks some of it under.

Five hundred to 1,000 pounds of stubble an acre, along with other conservation measures, protects the soil from erosion. In central Kansas, silty clay loam and silt loam soils require at least 500 pounds of residue an acre for small grains;

fine sandy loam twice that much. Double these amounts are needed for sorghum or corn.

Heigele says there is no "right" number of times to go over the ground between harvest and planting. The most important purpose of sweep tillage is to control weeds; it should not be done more often than necessary.

Heigele uses a 10-inch 14-hole hoe drill because it drills better through heavy residues than a 7- or 8-inch drill.

Ken Portenier, who farms with his father-in-law, Eugene Sanford, in Cloud County, reports that he has benefited from stubble mulching on upland wheatland over the last 3 years. Some of his land is vulnerable to wind erosion.

"Little soil blowing occurred in the 1966-67 drought, where it blew badly in the droughts of the 1930's and the 1950's," Portenier said. "Water erosion also is controlled by stubble mulching." The Cloud County partners, like Heigele, found that terracing and contour farming weren't enough.

Subsoil moisture

"Stubble mulching made a big difference in subsoil moisture," noted Wilbur Naylor, SCS work unit conservationist at Concordia. "In late winter, we dug down 32 inches in a stubble-mulched field and still found subsoil moisture. Other fields in the county that weren't stubble mulched had moisture down only a foot."

Portenier and Sanford use a three-section flexible sweep to undercut the stubble. Each blade works independently, thus avoiding damage to terraces. Stubble mulching saves time, labor, and fuel, compared to moldboard plowing. The amount of savings depends on how wet the soil is and how many times it is necessary to go over the ground to control weeds.

Brothers Clarence and Frank Garten, Dickinson County, find the same type of sweep best suited for their farm.



Matthew Heigele shows the residue left on the soil surface between the rows of the succeeding crop of wheat.

Another strong advocate of stubble mulching is Clinton Lundquist, chairman of the McPherson County Soil Conservation District and a former SCS work unit conservationist. As a farmer, he has had 10 years of experience with stubble mulching wheat on upland and wheat and corn on bottom land. He uses a spiketooth harrow behind his double-mounted 30-inch sweeps. The harrow kills weeds and nearly all volunteer wheat and smooths and spreads the stubble. Sometimes if the ground is hard right after harvest, he goes over it with a chisel.

Keep soil covered

Lundquist thinks in terms of keeping the soil covered. This in combination with terracing controls erosion well on his farm.

Larry Blythe, Morris County, is another veteran stubble mulcher. He figures he reduces the cost in time and fuel by one-fourth by using the three-blade sweep instead of moldboard plowing wheat and soybean stubble.

"Wind erosion was bad last March, but I undercut bean ground and it held," he said. He seldom does his tillage exactly the same way twice, indicating that what works one time may not work the next. Proper stubble mulch management depends on considering all soil, weather, and crop conditions, and these vary with time and place.

Many farmers in Saline County lost much of their 1967 wheat crop during the winter drought, but Byrne Kelley saved nearly all of his by undercutting the old stubble once and mulch treading four times in the summer of 1966. The mulch left on the surface not only protected the soil from blowing but helped conserve the few inches of precipitation that the farm received between the 1966 harvest and the 1967 growing season.

In the spring of 1967, Kelley was able to sink a steel rod 2 to 3 feet deep in a stubble-mulched field; but in a field that had not been stubble mulched, he could push the rod down only 1 to 2 feet. Deep undercutting first, followed by shallow treading, gives him the best results.

"Stubble mulched ground retains water. I can put on more fertilizer and raise my best wheat in wet years," he said. "This water-holding capacity bothers some wheat growers who are anxious to get wheat planted during a wet fall. But fall weather doesn't stay wet very long. Farmers have until December to plant wheat in this area. Some think they have to plant wheat early to control erosion and to provide wheat pasture. But, stubble mulching controls erosion, and late planting gets away from the Hessian fly problem."

These and other farmers' experiences in central Kansas indicate that stubble mulching is successfully moving eastward from the 20-inch rainfall area (where it controls wind erosion and conserves soil moisture) to the 27- to 30-inch area (where it also stops water erosion). ♦



"Mr. Coastal Bermuda," District Supervisor J. R. Davis, with one of the bales of hay that added up to 2½ tons to the acre in one cutting. The pickup baler takes up the windrow of cured grass and ties it into round bales dropped behind the machine.



District supervisor solves his forage problem and gets a custom business

"Mr. Coastal Bermuda." That's what they call Jesse Davis around the Winston County Soil and Water Conservation District in Alabama. Davis is a supervisor of the district.

Davis picked up that name 4

years ago when he, his wife, Jewell, and their son, Virgil, were struggling to produce forage for 83 cows on 200 acres of land. As often happens, they had the cows but not enough grass.

The most promising pasture was a 10-acre field of Coastal bermudagrass planted with sprigs the year before. After consulting with the local SCS soil conservationist, Davis bought a bermuda digger and planter. In the spring of 1963, he planted 90 acres of grass.

Then a new door of opportunity opened. His original plan was to plant grass on his own farm, then sell the planting equipment.

"But people kept after us to plant grass for them," Davis explained. "So we decided to give custom-planting a try."

In 1965, the Davises custom-planted about 100 acres, in addition to planting another 15 to 20 acres of their own. They dug sprigs from their farm for all of the plantings.

Before 1964, SCS workers, extension agents, and other technicians could get only 20 to 30 acres of Coastal bermudagrass planted in the county each year. In 1966,



thanks largely to the extra boost from the Davises, more than eight times that much was planted.

District Supervisor Davis now has the grazing and forage situation well in hand for the first time on his home farm. His 120 acres of Coastal bermudagrass and 80 acres of fescue-white clover keep his 120 cows in prime condition.

Davis takes full advantage of help from the Soil Conservation Service, Agricultural Stabilization and Conservation Service, and Extension Service.

Last season Davis sold about 5,000 bales of hay and put more than 14,000 bales in his barn. One barn still had 3,000 bales left over from the 1966 season. The Davises are glad to sell hay instead of buying it, as they did just three winters ago. With a total of 17,000 bales stored at the beginning of this winter, Davis' cows will not go hungry.

An interesting sidelight to the new situation on the Davis farm is that they can now plant fescue and white clover and keep a stand. Before the Coastal bermudagrass days, they couldn't let the grass develop a stand before grazing it. His cows now graze Coastal in the summer in preference to fescue. At the end of December animals grazing the fescue-clover pastures were still largely ignoring the hay racks.—BYRON M. OLIVER, *work unit conservationist, SCS, Double Springs, Ala.* ♦

The two-row sprig planter covers 5 to 7 acres a day.



Boy Scouts collect soil samples as part of their work in earning the merit badge in soil and water conservation.

Conservation badges earned by Scouts

Conservation is a big word to the Boy Scouts of America. This is especially true for those Scouts who must earn merit badges in either soil and water conservation or conservation of natural resources before they can become Eagle Scouts, the highest rank.

As early as 1965, several Scouts began working on their soil and water conservation badges on the watershed of White River Lake, site of the District Camporee, in the Rio Blanco Soil and Water Conservation District, Texas.

Under the guidance of the Soil

Conservation Service, they built a brush dam to stop a gully, studied conservation for wildlife, and learned some basic points about range conservation.

The Scouts saw a waterway being constructed and used engineering equipment to check it for proper construction. They learned that the waterway as designed would handle water during rains without gully-ing and would serve as an outlet for future terraces.

They studied different soil types: Referring to SCS soil maps, they dug holes to examine soil profiles; took samples of five different soil types; and made a display of them. They also made a field trip to study irrigation systems and the need for conserving scarce irrigation water.

At the troop court of honor, two of the boys demonstrated soil and water conservation to the rest of the troop by using small models of fields to show how plant cover reduces runoff and prevents erosion.

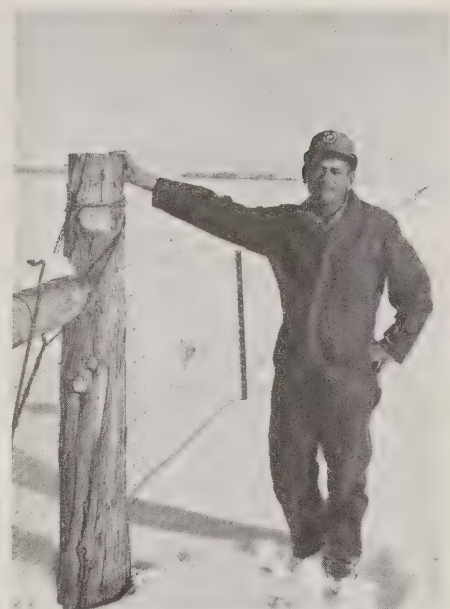
—ROBERT M. KRAL, *work unit conservationist, SCS, Crosbyton, Tex.* ♦

Water-supply outlook favorable in West

Water supply for irrigation and other purposes will be satisfactory this season in most areas of the West, according to the Water Supply Outlook for Western United States, based on April 1 snow survey data compiled by the Soil Conservation Service.

Prospects of streamflow from snowmelt are highly varied, according to the report. As of April 1, parts of Oregon and Southwest Idaho faced water shortages. And there may be a water shortage along the Arkansas in Colorado and western Kansas and the Rio Grande through New Mexico. On the other extreme, in Arizona surface supplies will be much above average.

The outlook for California is for adequate water supply to meet most demands this spring and summer. ♦



Larry Amaya feeds a mixture of farm-produced hay to his farm flock and shows the quality of his new fence.

On the way to a dream fulfilled

Desire and hard work are turning 240 acres of irrigated land into a dream farm for the Larry Amayas near Monte Vista, Colo. And a Soil Conservation Service Great Plains Conservation Program contract developed through the Rio Grande Soil Conservation District is helping make it possible.

Dream comes true

Less than 5 years ago Larry Amaya, a young, hard-working individual of Latin American descent, worked as a farm laborer in the South Plains of Texas. For years he and his wife Sandra dreamed of owning their own farm. In the fall of 1963, they found such a farm near Monte Vista.

The Amayas made an \$8,000 down payment saved by growing 15 acres of cotton and 10 acres of maize for several years and arranged the rest of the financing through the Federal Land Bank.

They and their five children moved to their new farm in 1965. The house was not modern, so Larry arranged for financing through the Production Credit Association and built a new house.

He also drilled a new domestic artesian well.

Amaya soon realized that although the soils on his farm were good, he would need to level and revamp his irrigation system and acquire more water because the canal water sometimes ran out before the end of the growing season.

After several visits with an SCS conservationist, he made a plan and signed a Great Plains Conservation Program contract through the Rio Grande District. Amaya drilled his first irrigation well in the spring of 1966, a second in 1967, and completed a 315-foot artesian well for stockwater that serves two 40-acre pastures. Together the two irrigation wells pump 2,400 gallons a minute.

Practices conservation

In the spring of 1967, he leveled 80 acres of irrigated land and seeded it to a mixture of alfalfa and brome grass. Amaya's overall plan calls for seeding the entire 240 acres of land in 3 or 4 years.

"We are planning for a flock of 300 ewes," Amaya says.

To date, he has completed four-fifths of a mile of new interior

fence to aid in pasture and hayland management, and he plans to build another 1/2 mile. The fences are scheduled for cost-sharing under the Great Plains Conservation Program.

The Amayas have also built a new 64- x 32-foot lambing shed and a new set of sheep corrals to serve the 300 ewes they plan to lamb each year. They have constructed a mile of new exterior boundary fence and have also improved the premises.

Plans for future

When visiting with the Amayas, you get the feeling they will make it on their own and that they will reach the goals they have set. Some of these are to get the oldest son, Larry, Jr., in college in the fall of 1969 and lay the groundwork for educating the other children.

"We will rent 40 to 100 acres of land to grow potatoes," Larry says, "and maybe someday we will grow some spuds at home. But right now, I want to build up the soil for top production to finance my children's college education."—DONALD A. Moss, *work unit conservationist, SCS, Monte Vista, Colo.* ♦

Editors and broadcasters discuss modern farming

Two organizations of agricultural communicators with a record of strong support to soil and water conservation are meeting this month. They are the American Agricultural Editors Association with 280 members and the National Association of Farm Broadcasters with 480 members. The AAEA is holding its summer meeting in Minneapolis, Minn., June 16-19; and the NAFB in Denver, Colo., June 30-July 3.

Both meetings will feature a variety of presentations aimed at bringing members up-to-date information on modern farming and agricultural communications.

The purpose of the AAEA, headed this year by Claude W. Gifford of *Farm Journal*, is to provide for and encourage a free exchange of ideas among editors and writers in the areas of farm production technology, marketing, and farm policy.

The purpose of the NAFB is to promote better and more successful farm broadcasting in service to agriculture and rural living. President this year is Keith Kirkpatrick of station WHO, Des Moines, Iowa. In both organizations are nonvoting members from industry, agribusiness, educational groups, and government.

Architects' conference on man and nature

The American Institute of Architects is holding its annual meeting this year in Portland, Oreg., and in Honolulu, Hawaii. The major part of the conference will be in Portland, Oreg., on June 23-26. On July 28 and 29 the conference will reconvene in Honolulu, Hawaii.

The theme for this year's conference is "Man—Architecture and

Nature." The keynote speaker on Wednesday, June 26, will be Mrs. Lyndon B. Johnson. Secretary Orville Freeman will chair a discussion during the conference with Dr. M. Gordon Wolman of Johns Hopkins University and Mr. Marvin B. Durning, a Seattle, Wash., attorney, as panel members. Numerous workshop discussions related to the conference theme will be held in connection with the annual conference.

Sanitarians plan research on environmental health

The annual meeting of the National Association of Sanitarians will be held in Washington, D. C., on June 23-27. More than 2,000 people are expected to participate. The main theme of the conference is program planning on research and environmental health.

Numerous topics dealing with liquid and solid waste disposal, water pollution, and other health problems will be discussed.

The National Association of Sanitarians strives for recognition of the sanitarian as a professional by establishing and promoting qualifications on education, experience, and on ethics.

Dates and places

June 2-7, American Water Works Association, Cleveland, Ohio.

4-7, National Rivers and Harbors Congress, Washington, D. C.

9-12, American Seed Trade Association, Chicago, Ill.

9-14, General Federation of Women's Clubs, Boston, Mass.

15-22, Outdoor Writers Association of America, Inc., Gardens, Ga.

19-21, American Society of Agricultural Engineers, Logan, Utah.

23-27, National Association of Sanitarians, Washington, D. C.

23-26, American Institute of Architects, Portland, Oreg.

28-29, American Institute of Architects reconvenes in Honolulu, Hawaii.

30-July 2, Newspaper Farm Editors of America, Denver, Colo.

30-July 5, National Education Association, Dallas, Tex.

July

13-17, American Association of Nurserymen, St. Louis, Mo.

21-25, Business and Professional Women's Club, Minneapolis, Minn.

28-31, National Association of County Government Officials, Washington, D. C.

Review



Agriculture and the Quality of Our Environment. EDITED BY NYLE C. BRADY. 1967. *Amer. Assoc. Adv. Sci. Publ.* 85. Washington, D. C. 460 pp. \$13.50.

Forty-three contributors, 10 of them from the U. S. Department of Agriculture, furnished the contents of the four sections of this report of a symposium at the annual AAAS meeting in December 1966.

The sections cover (1) Agriculture and Air Quality, (2) Agriculture and Water Quality, (3) Soil Pollution in Agriculture, and (4) Human and Animal Wastes.

The opening chapter on air pollution describes impacts on agriculture, noting that some of the damaging air pollutants arise from agriculture itself. Dusts, smokes, and odors are probably the most widespread of these; but pesticides, reactive organic vapors, and oxides of nitrogen from burning wastes are significant. Damages to crops and livestock are increasing, and establishment of air quality standards is timely.

The introductory chapter on water quality concludes with the note that the solution to pollution in rural areas as well as in cities is likely to be waste-water reuse. Agricultural processing wastes are cited as a significant source of pollution. Sediment and its control are included; and it is pointed out that control at source provides the most satisfactory solution to the problem. Salinity and dissolved solids pollution are also considered. Of particular significance to agriculture and forestry is the proposal of the "living filter" sewage disposal system which uses crop- and forest-land surfaces.

Soil pollution derives from radioactive substances, fertilizers, pesticides, and metals. Strontium-90 is observed to be caught and bound in the top 8 inches of soil, so that

it may be concentrated by erosion and redeposition. Cesium-137 behaves similarly.

Radionuclide pollution of soil is not considered to present any significant health hazard. Nitrogen in rural water supplies is attributed to natural sources, fertilizers, and domestic wastes; in some areas it has built up to hazardous levels.

Pesticide pollution of soils involves both the older metallic poisons and the more recent halogenated hydrocarbons of which DDT is most widespread. Copper, zinc, mercury, and lead are cited as the most significant metal pollutants of the soil; they may originate from fertilizers and pesticides, from wastes, or from fallout of air pollutants.

The final section brings up one of the most significant, yet newest of pollution problems: animal wastes. Domestic wastes in rural areas, waste characteristics, hazards, and disposal methods are discussed first, followed by four chapters on different animal wastes. These wastes are reported to equal in volume 10 times that of the human population of the country and contribute to air pollution, water pollution, nuisances, and disease. Drainage and runoff from feedlots where wastes are concentrated are cited as particularly important.

This book will be a much-used reference for a long time.—W. E. BULLARD, JR., *Resource Development Division, SCS, Washington, D. C.*

Soil, Water and Suburbia. 1968. USDA and U. S. Dept. of Housing and Urban Development. 160 pp., illus. \$1.25.

The proceedings of the Conference on Soil, Water, and Suburbia, held under the joint sponsorship of the two departments in Washington, D.C., June 15–16, 1967, provides a handsome showcase for the papers and related discussion on the problems of land in transition as communities grow.

Participants in the conference, by necessity limited to 500, un-

doubtedly will find in this report a renewal of the stimulation they felt in hearing authorities diagnose and prescribe for the many ills of the expanding cities of America. Others—public officials, community planners, engineers, developers, financiers—who deal with the problems of resources under the pressures of more and more people will find a compelling source of excitement and information.

The illustrations alone, gathered by the editors with obvious care and considerable effort, merit study.

Secretary of Agriculture Orville L. Freeman, an opening speaker in the conference, observed: "Suburbia, which most assuredly is land in transition, is something new in America. It isn't rural—it isn't urban. Yet it's both. And because it is neither and yet both, it's apt to be a kind of no man's land where development is too often thoughtless, unplanned, and uncontrolled."

And Secretary Robert C. Weaver of the Department of Housing and Urban Development, added: "... We cannot let haphazard development shape our lives. We must use our great resources and technology to make the land and our cities serve the people. Now is the time to develop an urban land policy and an urban conservation ethic comparable to the policy we now follow on farm and forest."

Even those concerned with the tribulations of the inner city will find in this compilation much food for munching as they plan.—T. A. JENKINS, *Information Division, SCS, Washington, D. C.*

Conservation Education: A Selected Bibliography. By JOAN CARVAJAL AND MARTHA E. MUNZER. 1968. *Interstate Printers and Publishers, Danville, Ill.* (for Conservation Education Association). 98 pp., paper. \$2.50.

The Conservation Education Association in this booklet provides a much-needed survey of recent books in the broad field of resource

conservation that should be equally useful to educators, conservationists, and concerned citizens. The selections seem to have been made objectively, the comments are informative, and the coverage of the diverse subject matter is well balanced.

The project was supported by a grant from the Conservation Foundation. This bibliography is a sequel to one published in 1955 covering the period 1938–55. It is the fourth in a series of educational aids by CEA under the title "Education. . . Key to Conservation."

The philosophy expressed in the introductory sections and evident in the selections is in harmony with that of the Soil Conservation Service; i.e., that all resources are interrelated and that all fields of knowledge must be considered in their management and conservation.

The book is dedicated "to the memory of Robert L. Brown, State conservationist for Hawaii," with this notation: "When the Conservation Education Association started its work on this project, Bob Brown was completing a conservation bibliography for the schools of Hawaii. His untimely death has deprived us of his generous offer of assistance." Even without his help, the result surely would have pleased Bob Brown.

The subject matter is organized under four general headings: Interrelationship of resources (i.e., ecology), natural resources (air, water, plants, etc.), role of man (conservation, quality of environment, social implications, population, planning), and tools for teachers.

The booklet has the limitations that apply to any "selected" bibliography. They are acknowledged by CEA President Wilson F. Clark in the foreword: "A bibliography is a strange kind of publication. It never satisfies its audience; it goes out of date as it goes to press, and it is never as complete as one would like."

Any well-informed conservationist probably would have made other selections, especially in the field of his specialty. Almost anyone might have included other titles in the "basic collections" recommended for initial conservation libraries for early elementary, middle grades, high schools, and teachers and group leaders with budget limitations of \$25, \$50, \$100, and \$150. Nevertheless, the lists offered will be useful to people confronted with making such selection.—B.O.

New publications

Proceedings, Texas Conference on Soil, Water, and Suburbia. (1968). *USDA Soil Conservation Service, Temple, Tex.* 89 pp.

Pains and cures connected with a rapidly changing America—those examined and discussed in the national conference in Washington, D. C.—were brought to narrower focus in a Texas conference on Soil, Water, and Suburbia in Austin, October 25 and 26, 1967.

Among highlights recorded in the published proceedings are the presentations by a group of San Antonio officials who described in detail the use by their city of Federal assistance in planning for a San Antonio of 50 years hence.

America's Changing Environment. BY VARIOUS AUTHORS. 1967. *Daedalus* 96 (4): 1003-1225. Fall issue. Single copy \$2.00 from American Academy of Arts and Sciences, 280 Newton Street, Brookline Station, Boston, Mass. 02146. This issue of the journal of the academy is devoted entirely to a series of thoughtful and informative papers on problems of environmental quality. The authors are well-known authorities in the fields of ecology, landscape architecture, and resource management.

Soil and America's Future. (1968). *Soil Conservation Society of America, Ankeny, Ohio.* 236 pp., illus. \$5.00. Proceedings of the 22d annual meeting of SCSA, Des Moines, Iowa, August 13-16, 1967. Panel subjects are: Soil and America's Future; Land Management for Tomorrow's Agriculture; Resource Conservation Problems and Progress; Sediment and Nitrates in Soil and Water Management; Soil Erosion Problems and Controls; Resource Conservation through Education; Managing the Environment for Quality Living; Land Use and Soil Surveys.

Technical Action Panels. 1968. *USDA PA-850.* 4 pp. leaflet. Rural areas development and outreach functions of the county boards composed of representatives of USDA agencies in each.

Forests and Wildlife. BY U. S. FOREST SERVICE. Rev. 1967. *USDA Conservation Teaching Aid FS-37.* 4 pp., illus. A basic statement about wildlife in the national forests, prepared especially for use by students but informative for the general public.

Questions and Answers on the Golden Eagle Passport and Other Federal Outdoor Recreation Fees. 1968. *U.S. Dept. Interior, Bur. Outdoor Recreation.* (12 pp.).

Financing Home Purchases and Home Improvements. 1967. *U. S. Dept. Housing and Urban Development HUD IP-31.* 15 pp., illus. \$0.10.

Soil surveys

Pulaski County, Indiana. BY SIDNEY PILGRIM. 1968. 84 pp., illus.; maps 4 inches to the mile (1:15,840). Fieldwork by R. Bell, P. Edmonds, K. Huffman, G. Preston, A. Zachary, and D. Post.

Columbiana County, Ohio. BY HEBER D. LESSIG, WILLIAM F. HALE, AND J. LESLIE YOHN. 1968. 132 pp., illus.; maps 4 inches to the mile (1:15,840).

Blaine County, Oklahoma. BY CARL F. FISHER. 1968. 84 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils sur-

veyed by Carl F. Fisher, Donald G. Bartolina, and Duane L. Rieke.

Fayette County, Kentucky. BY RAYMOND P. SIMS, DARWIN G. PRESTON, ALFRED J. RICHARDSON, JOHN H. NEWTON, DAN ISGRIG, AND ROBERT L. BLEVINS. 1968. 62 pp., illus.; maps 4 inches to the mile (1:15,840).

Robertson County, Tennessee. BY RECTOR H. MONEYMAKER, JAMES F. BRASFIELD, JOHN B. COTHRAN, BOBBY B. HINTON, EUGENE T. LAMPLEY, AND J. PAUL SUTTON, JR. 1968. 61 pp., illus.; maps 4 inches to the mile (1:15,840).

Sherburne County, Minnesota. BY M. F. GRIMES. 1968. 81 pp., illus.; maps 4 inches to the mile (1:15,840). Field survey by M. F. Grimes, M. G. Ziebell, C. K. Sutton, L. M. Chamberlain, and E. Meir.

Stark County, North Dakota. BY KERMIT E. LARSON, A. F. BAHR, WILLIAM FREY-MILLER, RICHARD KUKOWSKI, DONALD OPDAHL, HOWARD STONER, PAUL K. WEISER, DONALD PATTERSON, AND ORDELL OLSON. 1968. 116 pp., illus.; maps 3.17 inches to the mile (1:20,000).

Giles County, Tennessee. BY J. C. TRUE, J. F. CAMPBELL, E. P. DAVIS, AND D. L. MONTGOMERY. 1968. 69 pp., illus.; maps 4 inches to the mile (1:15,840).

AMERICA THE BEAUTIFUL COLOR LITHOGRAPHS



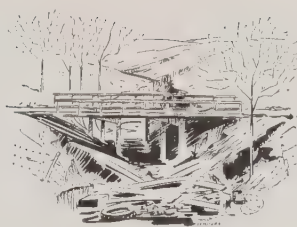
America The Beautiful—California

USDA SOIL CONSERVATION SERVICE
HORSES ON IRRIGATED PASTURE, ELSINORE-MURRIETA-ANZA SOIL CONSERVATION DISTRICT

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From the Administrator:

What Are We Doing to Our Environment?



Our changing country has changing needs. We have been so busy growing, developing, and exploiting that we haven't taken time to assess what we were doing to our country and to ourselves. Suddenly, now, some major—and disastrous—situations are forcing themselves to our attention.

Where is the bountiful supply of clean sparkling water? Where is the clean fresh air to breathe? Where is the scenic beauty of an uncluttered landscape framed in a clean blue sky? What have we lost?

Quality of environment is what we have lost—are still losing.

In recent years, the Soil Conservation Service has been giving increasing attention to the “amenities” of the rural landscape along with the factors that affect the productive potential of the land. It has encouraged and assisted land owners and users to develop outdoor recreation facilities, to preserve and enhance natural beauty, and to provide habitat for wildlife.

Now, the Secretary of Agriculture has issued an official directive (Secretary's Memo. 1631) making the enhancement of the quality of the environment a basic policy of the Department.

“The Department, in cooperation with other agencies, is committed to improving, protecting, and restoring environmental values in the face of unprecedented demands being made on these values by modern society. Degradation of the environment, either rural or urban, can harm man, and other plant and animal life,” the memorandum says.

Quality of environment is a concept difficult to define, for it depends much on individual preferences and evaluations. In the

Secretary's memorandum, environment means simply “living conditions for people.” Thus, the total landscape—not, as originally, just the problems of soil erosion and runoff—becomes the concern of the Soil Conservation Service.

One of the biggest environmental problems we face is that of reducing damages and losses from pollution of soil, water, and air by agricultural chemicals, crop and livestock wastes, sediment, sewage, mineralized drainage, garbage, and litter. We suffer from a tremendous disregard toward wastefulness.

The different kinds of wastes often have interrelated effects. Most of the principal kinds of pollutants *are* wastes, or are associated with wastes.

Sediment, itself, is the most widespread and significant pollutant in water. In addition, pesticides and plant nutrients may be carried by sediment. The interaction of these substances in damaging environment is related to agriculture. Some come from agriculture; all may do harm there. Four billion tons of sediment move into streams each year, more than half of it coming from crop and range and forest lands.

Air pollution from industrial operations and use of fossil fuels cause half a billion dollars damage to agriculture each year. And 30 million tons of natural dusts derived from soil blowing from cultivated fields and deteriorated rangelands and from highway and construction sites also cause great damage.

Plant nutrients come from sewage from animal manures and from runoff and seepage from land. They may result in unwanted growths of aquatic plants that lead to unpleas-

ant tastes and odors and may even become toxic. Waste production from domestic animals in the United States is close to 2 billion tons a year, and half of it is produced in concentrated supply.

Millions of tons of sulfuric acid from coal mines pour into our rivers in the East; while in the West, equal amounts of inorganic salts from geologic deposits or accumulations in arid lands are washed into the streams by natural percolation and irrigation return flows.

Twenty-five million tons of slashings are left each year by logging, a reservoir for tree diseases and insects and a serious fire hazard. Forest fires each year produce more than 30 million tons of smoke particles and more than 330,000 tons of volatile hydrocarbons.

Some 470 million pounds of pesticides are used annually on about 80 million acres of land. Although generally useful and necessary to agricultural production, some may cause damage beyond their targets, are slow to break down in nature, and are carried into water.

Our policy is to prevent, or to control as far as possible, these threats to environment. We want to control them at their source, before any damage occurs; and where we can, avoid them by finding better ways to operate.

We expect to enhance our total environment, as directed by the Secretary, to improve the attractiveness of rural living, to expand outdoor recreation, and to protect public health as well.

All this means new and broader programs, in which we will take part, toward providing and maintaining a healthy, attractive, prosperous, and vigorous environment for all Americans. To prepare ourselves for this new outlook and work, we must consider in detail the problems we will face and be ready to cope with them armed with all pertinent available information.

D. A. WILLIAMS



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Parallel terraces on the High Plains



Parallel terraces on the Gerald Norman farm southwest of Post, Tex., in the Garza County Soil and Water Conservation District, enable the farmer to use large row-crop equipment efficiently.

In the large field in the foreground, only one odd-shaped area

between terraces and a triangular corner interrupt the full-length rows. These areas are planted to sown crops.

The widths of the terrace ridges and of the intervals between are calculated to accommodate a feasible number of "passes" of the

equipment being used.

The terraces were constructed with cost-sharing from the Great Plains Conservation Program and technical assistance from the Soil Conservation Service, both made available through the conservation district. ♦

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soil conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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CONSERVATION EDUCATION IN ACTION

SOIL CONSERVATION SERVICE

U. S. DEPARTMENT OF AGRICULTURE



COVER: Students study plants from the New Jersey pine barrens in an "artificial natural area" on their school ground in the Freehold Soil Conservation District.

Learning . . .

A generation of young people, 90 percent of them growing up in cities and towns, needs a chance to learn about natural resources.

This issue of *Soil Conservation* looks at some of the things being done, in schools and out, to give young people an intelligent concern for resources.

On the ground: One lesson is obvious—the place to teach about the outdoors is *outdoors*.

Educator Robert R. Finlay, at our invitation, shares Ohio's experiences in providing "land for learning" to complement classroom instruction (p. 267).

The principle of on-the-ground learning is uppermost also in Educator James Miller's and Conservationist Palmer Skalland's account of outdoor classrooms in Michigan (p. 271).

In both states, as elsewhere, SCS helps teachers and officials plan and establish these outdoor facilities.

Teaching the teachers: Conservationists are learning, secondly, that the need for resource education is so great that they cannot meet it as an incidental activity.

They must direct their efforts to preparing teachers to do the teaching.

One way is through teachers' workshops, like that in Oregon described by Conservationist Roy Johnson (p. 269).

In Indiana, district supervisors arranged for student teachers from the nearby university to extend the efforts of resource specialists. Supervisor Barbara Restle tells that story (p. 275).

soil conservation

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Land for Learning

By Robert R. Finlay

Education consultant, Ohio State Department of Education, Columbus, Ohio



On school land laboratories, children get to know the out-of-doors OUTDOORS

Many communities have within their boundaries some potentially fine outdoor education areas. What is more, most facilities can be made operative at relatively low costs.

Excellent learning opportunities may exist on either the planned or unplanned portions of a school site. The undeveloped parts of a property generally offer the best terrain for establishing instructional programs. But lawns, landscape plantings, patios, courts, and playgrounds also can be integral parts of the total plan.

Any plot of land

It takes much planning and much cooperation to attain full use of an outdoor laboratory, but the efforts are certainly within the capabilities of most teachers and school administrators.

What, then, is a "school land laboratory?"

It can be any property controlled by the board of education that is readily accessible to students and

that may be used to enrich learning about soil and water relationships and plant and animal life. These areas have been referred to as "lands for learning," and the like. In Ohio the term "school land laboratory" has wide acceptance by educators.

A land laboratory may vary in size from a small area close around a school building to an expanse of many acres. One urban elementary school developed an excellent program on a plot that measured 39 by 49 feet. A few rural consolidated schools have areas in excess of 100 acres for laboratory use.

Let us assume that a school has some available land and that there is evident interest in such a project on the part of the school board, administration, and teaching staff.

Experience has shown that the first step should be a preliminary site study. This might best be done by a team which would include an outdoor education specialist, a naturalist, a technician in soil and water management, and a local school administrator. A favorable

written report from this group would serve as a basis for additional detailed studies for specific areas; e.g., ponds, marshes, woodlands, old fields, fence rows, and the like.

Preserving natural features

On a newly acquired site it would be highly desirable to work with the architect to preserve a maximum of natural features. Unfortunately, the preservation of these educational resources is usually given little consideration by engineers and architects. As a consequence many excellent school land laboratory sites have been destroyed during construction periods, or, if not obliterated, extensively damaged.

Land laboratories can be used by pupils and teachers at all grade levels. There are usually opportunities for nature study, for observing the effects of plants and animals on each other, for growing plants, and for many kinds of experimentation. All of this can be coupled with developing an appreciation for the out-of-doors.



What mysteries are exposed where the water meets the land? Fortunately is the school that has its own little pond.

Plans for larger sites, especially those adjacent to secondary schools, often include nature or conservation trails, wildlife areas, ponds, woodland management areas, Christmas tree plantations, and other resource-based projects. Possibilities are unlimited if administrators and teachers are aware of the values of outdoor education.

In a recent study of a 150-acre site at a rural consolidated high school, it was found that surface drainage was creating severe erosion problems and that proposed playing fields were being placed on bottom land near a small creek. At the time of visitation, no plans had been made to handle excess water on the area. Now, a complete soil and water conservation plan for the entire property is being prepared with the assistance of the Soil Conservation Service. Preliminary studies indicate that some diversions will be constructed, a spring will be developed, streambanks will be improved, a small shallow pond will be created, and a larger pond of greater depth will be established. The drainage problems of the school ground will be solved by the planned conservation work. Al-

though some of the work will be done under contract, much can be done by students in the vocational agriculture and biology classes.

What will these changes mean in terms of outdoor educational experiences?

It is planned to have students in the advanced mathematics classes work with the technicians and engineers in doing some of the necessary surveying.

The vocational agriculture boys are building the diversions, developing the spring, and establishing contour strips on the cropland area.

The biology classes will obtain laboratory material from the shallow pond. They will initiate long-term studies on the growth and control of aquatic plants and fish populations in the deeper pond. This impoundment will also serve as a source of water for irrigating the playing fields during prolonged dry spells.

Other suggestions for development of the land laboratory include a limited Christmas tree plantation, some reforestation on an open hillside, a timber stand improvement project in the wooded tract, and the improvement of wildlife habitat.

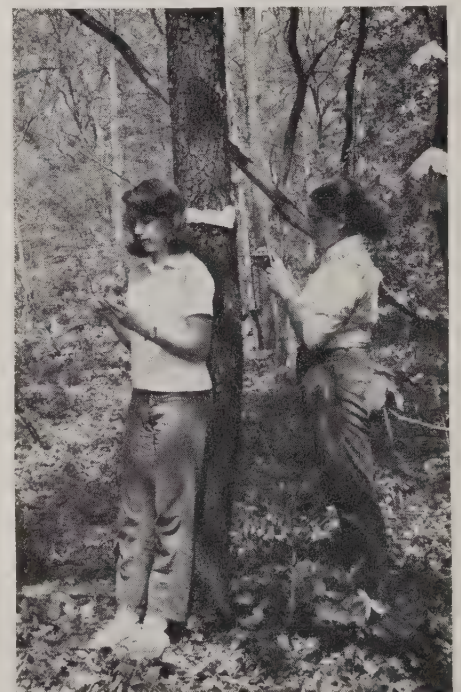
These projects will be done in cooperation with state forestry and wildlife personnel.

Under proper guidance the biology students will plan and develop a nature and conservation trail. A local sportsmen's group has indicated a willingness to provide funds to construct an outdoor classroom at an appropriate spot along the trail, and a Boy Scout troop has offered to construct three small bridges that make parts of the laboratory easily accessible. This type of involvement is highly desirable in maintaining school-community relationships.

Conservation deals with the management of land, water, minerals, plants, and animals. Consequently, many learning experiences in conservation are best provided out-of-doors where the resources exist.

Unless schools make some provision for real work with natural resources, many children will never have firsthand conservation experiences. The development of a school land laboratory offers a practical and inexpensive way to meet these needs. ♦

Two high school girls get experience with compass and increment borer on a forest growth study plot.



A firsthand look at what to teach . . .



Western teachers go to school in Oregon forest setting

By Roy A. Johnson

Soil conservationist, SCS, Hillsboro, Oreg.

How would you like to go to school in an outdoor classroom nestled high in the Cascade Mountains? That is what teachers from Oregon, Washington, Idaho, and California did last summer at Hoodoo Bowl Ski Lodge in Oregon's Willamette National Forest. And it was the 13th straight year for the teacher-training workshop on wise use of natural resources.

At the continuation center

The Portland Continuation Center of the Oregon State System of Higher Education sponsors and directs the workshop. Teachers attending receive three credits, either graduate or undergraduate, for the course.

There were three 1-week sessions during the summer, with 36 teachers attending each one.

Continuation center curriculum planners believe the best place to

teach resource conservation to teachers and school administrators is outdoors. Students get theory and practical application at the same time at Hoodoo. How resources are related and interdependent is emphasized and demonstrated.

The continuation center uses the team approach in teaching, working with experts of the separate agencies. Resource consultants on the staff are from the Oregon State Game Commission, private forest industries, and the Forest Service and Soil Conservation Service of the U. S. Department of Agriculture. Other resource consultants are used at various stops during field trips.

Private timber companies, power and light companies, soil and water conservation districts, garden clubs, and other groups provide money scholarships for teachers. Last year, these groups donated \$3,800.

The schedule for the week-long workshop included:

Sunday afternoon—Gathering soil, plant, insect, and other specimens for study and identification.

Monday morning—Introduction to the Hoodoo area with discussions on geology, climate, soils, forestry, and game management.

Monday afternoon and Tuesday—Outdoor instruction in natural science, soils, forestry, fish and game management.

Wednesday—A firsthand look at the soils, water management, cropping systems, range management, forestry, game management, and recreation on the east side of the mountains.

Thursday—A farm stop where soils, conservation planning, upland game bird management, and woodland management are studied. And a look at tree farm timber man-

agement including woodland soils, forestry reproduction and forest thinning, harvest cutting, tree planting, and tree seed orchards.

Friday—A field study of lava flows, cinder cones, and multiple-use management of national forests; observation of timber harvesting practices, tree planting, and recreational development.

Saturday morning—Using the knowledge gained during the week to make an inventory of the outdoor classroom site and make suggestions about how the site could be used as an outdoor classroom for school children. This was followed by a formal written examination.

Help back home

Teachers and administrators attending the workshop have returned home and helped their co-workers integrate conservation education into the regular curriculum fields of study.

Two fine examples of this are found in the activities of the Bend and Parkrose school systems.

In the Bend schools, graduates of the workshop have been instrumental in developing conservation ma-



At Lost Lake in the Cascade Mountains, Austin Hamer, then of the Oregon State Game Commission, tells a class of teachers about lake management for sport fishing.

terial to be incorporated into the regular curriculum. The material is now used throughout the school system.

In the Parkrose schools, a committee of teachers—many of them Hoodoo graduates and resource consultants—have developed a "Conservation Scope and Sequence

Chart for Soils, Water, Plants, Wildlife, and Minerals" as part of the regular school curriculum. ♦

USDA HELPS CITIZENS BEAUTIFY THEIR LANDS

For more than 100 years USDA has worked with the private citizens who own the rural lands that comprise three-fourths of our Nation's area. While these citizens decide how their lands will be used, USDA encourages and helps them in many ways to maintain beauty where it exists, to restore beauty where it has been marred, and to create beauty by using land, water, and forests in ways which enhance the quality of environment for man.

Soil and water conservation districts in the United States derive their powers and responsibilities from enabling acts of each of the 50 States and Puerto Rico.

These conservation districts have challenging and ever-widening responsibilities for conservation and development of the Nation's soil, water, and related resources. ♦

SCS Soil Scientist Clarence Olds uses a trench to show teachers the characteristics of a soil.



With outdoor classrooms now on at least 287 Michigan school grounds, very few of the State's young people will finish public school without some introduction to conservation of natural resources.

Students in many schools can just step out the door and see conservation in action. Some of them can look out the window and see a tiny watershed protection program doing its job.

To plan it that way, schools become soil conservation district co-operators like any other landowner and receive onsite technical assistance from the Soil Conservation Service.

SCS State Conservationist Verne Bathurst has instructed fieldmen to adapt conservation planning on school grounds to meet specific teaching needs. In most instances, it is possible to provide examples of a wide variety of conservation practices that demonstrate the intelligent management of resources.

A model watershed

Lincoln Elementary School at Coldwater is a good example. The school was built next to 117 acres of park and fairgrounds. The builders used some excess excavated soil to build a small model watershed—complete with detention dam, diversion, and grassed floodway. Water coming off the roof and the lawn was directed to put on a show for the children watching from beneath the roof overhang. The backslope of the dam has been treated as a wildlife habitat.

Carlo Heikkinen, superintendent of Coldwater Public Schools, and Hale Pearce of SCS, who assisted with the overall plan, say the acre-and-a-half watershed is even better than a full-sized one for showing pupils how water-control measures function. Others who assisted with the plan were Jerry Fair, the school architect, James A. Miller, director of out-door education, and school board members, together with local Soil Conservation Service personnel.

Michigan schools put real action into conservation education

By James A. Miller and Palmer G. Skalland

Director of outdoor education, Coldwater Public Schools, Coldwater, Mich., and state soil conservationist, SCS, East Lansing, Mich.

The plan included:

(1) A diversion of the water from the school building.

(2) A stone-lined waterway, built by students, to carry the water to a 4-foot lower level.

(3) Grass plantings on the lawn which had been reshaped.

(4) A diversion terrace to divert water from the upper school ground to a catch basin 6 feet below and over a grassed waterway leading to a cement block erosion-control structure at the river.

(5) A gradient terrace on the lower school ground to break up the slope and prevent erosion.

Additional plans for outdoor classes at Coldwater include some phases of the entire curriculum. These may include a sundial for time studies, a hole in the lawn for soil profile studies, a history chart using the sidewalk as a scale of years, or a United States map painted on the parking lot.

Another example is at Ann Arbor

High School where the conservation classroom covers 27 acres. Ten acres is in woods that are laced with nature trails. There is also a pond. One open area was kept as a farm field and treated with stripcropping and contour farming. Dr. Bill Stapp is the prime mover for the project. He is also a conservation education consultant and a professor for the University of Michigan's School of Natural Resources.

Not every school, however, can have a park next door, a watershed on the grounds, or a 27-acre site, but nearly every school has a little space. The Fletcher Elementary School at Ypsilanti has less than an acre, but it boasts autumn-olive plantings, multiflora rose, plots of grass, and a drainageway.

If students and teachers want to look further into conservation, the Kalamazoo Nature Center has 500 acres where busloads of young citizens can see everything from tropical plants to terraces. Students from

A gradient terrace gives the school grounds protection from erosion and the student's a demonstration in conservation.





Students from Coldwater Public Schools visit a seedling pine and spruce nursery used in developing an outdoor laboratory.

about a 40-mile radius are regular visitors, but they come from all over the State at times. Last year 30,000 students visited trails with well-marked conservation practices, soil formations, plant species, and natural wilderness. Supported by endowments, membership fees, and service charges the center offers conservation education ranging from outdoors appreciation for first graders to training for teachers.

Training for teachers

Best of all, the school forces in Michigan are squarely behind conservation education. The universities include courses for teachers. The State Department of Education has a full-time outdoor education consultant in Al Dighera. He will serve as recording secretary for the committee on conservation education, made up of teachers, educators, and conservationists.

Groundwork was laid several years ago by Benjamin E. S. Hamilton, a curriculum consultant for the State superintendent's office. He serves as permanent secretary to the Conservation Education Committee which meets several times yearly to provide the curriculum

leadership in conservation education. SCS is a member of this committee and is represented by the state soil conservationist.

Eastern Michigan University at Ypsilanti has a 6 weeks' summer shortcourse for teachers called the Biology, Earth Science, and Resource Use Institute. Dr. Lawrence Ogden, associate professor of geography, and his associates choose from 200 or more applicants to fill the 35 spaces each year. The National Science Foundation sponsors the institute and provides scholarships to those who attend. Last year teachers from 22 states came for the study.

John Trustdorf, SCS work unit conservationist at Ann Arbor, is one of many SCS people throughout the state who takes the group on field trips.

The Higgins Lake Conservation School, a summer camp for teachers, is another meeting which attracts a full house each year. The Michigan Conservation Department sponsors the school.

Two things make Michigan a leader in conservation education. First, by including it in the curriculum, the State Department of Edu-

cation, universities, and public schools lay the framework for teaching conservation.

Next, the teacher is given the know-how and the facilities for teaching. Courses in conservation are available, and a site for studying the natural world and conservation principles has been provided near at least 287 school grounds. With a little support and technical help from SCS and conservation district people, the teaching is done by trained teachers on a do-it-yourself basis.

In this way, a new generation of land users learn conservation in a state that believes in conservation and acts on this belief. ♦

SEDIMENT HURTS RECREATION AND FISHING INDUSTRY

Sediment greatly reduces the attraction of many lakes and reservoirs for swimming, boating, fishing, and other water-based recreational activities.

It destroys the spawning beds of game fish, ruins their eggs, and reduces their food supply. Fish eat the worms, insect larvae, and other small aquatic animals that feed on microscopic plants, but muddy water shades out light, interfering with the growth of the microscopic plants.

In many small streams, sediment fills the deep pools that provide a refuge for fish during the dry season.

Most streams and lakes no longer have so many fish as they once had. Less desirable species, such as carp, sheepshead, and buffalo, that thrive in turbid waters, are replacing the game fish.

In the broad, shallow bays of western Lake Erie, fishing for yellow perch, cisco, and whitefish was once an important industry. ♦

Excessive pond seepage

Excessive seepage in farm ponds is usually due to soils in the pond site that are too permeable to hold water.

De suelo y agua

Conservationists of many lands learn in Puerto Rico

By Joaquin F. Marrero

Formerly soil conservationist, SCS, San Juan, Puerto Rico

About 15,000 people from 143 countries have received training under foreign assistance programs in Puerto Rico since May 1950.

That first year, 145 foreign participants and observers took part in the program. The number has continuously increased.

The Soil Conservation Service and other agencies of the U. S. Department of Agriculture have been active in this program since 1952. In 1967, 242 came to Puerto Rico for training in agriculture alone.

The majority of the visitors have come from Latin America where the native language is Spanish, the same as that used extensively in Puerto Rico. Others came from Asia, Africa, and the Caribbean Islands.

Firsthand experience

Most of the participants in the program get the training under an agreement between USDA and the Agency for International Development.

In fiscal year 1967, the Federal and Commonwealth Government agencies provided training to 242 persons in agriculture. This training was in soil and water conserva-



Trainees in soil and water conservation question District Supervisor Mariano Mari (since deceased) on a visit to his dairy farm.

tion, extension education, supervised credit, cooperative organizations, forestry, agricultural research, and rural sociology. Fifty-one of these participants spent some time with the Soil Conservation Service.

The visitors assigned for training with the SCS have learned about the organization and operation of the Service and of soil and water conservation districts. They have been given on-the-job training in how these organizations help landowners plan for and use conservation practices. Many of these visitors have returned home and applied this knowledge to improving natural resources in their own countries.

Many of those taking part in the training program in Puerto Rico have said that an important benefit to them has been the opportunity to evaluate soil and water conservation practices and procedures that they can best use in their countries. They compare their economic development, type of agriculture, availability of labor, and related factors with those of Puerto Rico and find the problems are quite similar.

"My visit to Puerto Rico was a

highlight of my training in this program," said Abdulai Adaji of Northern Nigeria. "We have learned how we can develop our own country, which has similar conditions to those of Puerto Rico. We can apply soil conservation methods we learned in Puerto Rico to our own conservation work at home."

Just like home

James Akande, also from Northern Nigeria, said it would have been helpful to spend more time in Puerto Rico because the climate and crops there were similar to those of his own country.

"After our training in Puerto Rico, I knew a lot about the operation of the Soil Conservation Service and soil and water conservation districts," said Agu Mikpa of Eastern Nigeria.

Many participants in the program found added advantages to their stay in Puerto Rico from visits to the homes of SCS field personnel and participation in social and civic activities.

Technical assistance for those taking part in the program in Puerto Rico has been handled through the



Practice in the use of the farm level is part of the training of Manuel P. Singson from the Philippines.

Counties to maintain RC&D water-control measures

Six South Carolina counties in the Lowcountry Resource Conservation and Development Project area have agreed to take over operation and maintenance responsibility on Public Law 566 and RC&D flood-prevention and drainage installations within their boundaries.

Charleston County has had the policy for some time of maintaining community drainage and flood-prevention projects, but until recently such work in the other five counties was the responsibility of the land-owners in the respective project areas.

The move was touched off when Cottageville, an incorporated town in the Colleton Soil and Water Conservation District, applied for resource conservation and development assistance on flood prevention and drainage. Preliminary data developed by the Soil Conservation Service indicated that property owners would have to pay 20 to 30 mills of tax for operation and maintenance.

Charles Adams, chairman of the project, organized 21 community leaders and approached the county legislative delegation at a public meeting. Within a week the delegation voted to assume the maintenance and operation of all such projects within Colleton County. The remaining counties in the project area took similar action, and Berkeley County went even further. Its delegation voted to include community-type ACP group jobs.

"This is tremendous progress," says Charles Fraser, chairman of the Lowcountry Resource Conservation and Development Project Commission. "Now we should be able to develop the Lowcountry."—GEORGE E. HUEY, *assistant state conservationist, SCS, Columbia, S.C.* ♦

Office of Technical Cooperation, Commonwealth of Puerto Rico, Department of State.

Orientation and language

Before reporting to the agency to which he is assigned for training, the participant is given an orientation in English or Spanish, depending on the language he better understands. The orientation deals with the background of social, cultural, religious, political, agricultural, and industrial life of Puerto Rico and methods of solving island-wide problems. He is also provided information concerning transportation, health, and medical needs, and other personal matters.

The length of the training period with SCS varies from 2 to 5 days for groups and from 2 to 4 weeks for individuals. In some cases, such as those being trained in soil survey and classification, the training lasts as long as 3 months.

A short course of 3 to 4 weeks for multicountry groups has been conducted in the past 4 years. For these groups, the SCS Caribbean Area

program staff conducts intensive training in all phases of soil and water conservation.

Participants from South and Central America, Africa, and Asia find definite similarities in crops, climate, and topography to those of their own countries.

Visitors have been favorably impressed with Puerto Rico, often referred to as the tropical showcase of the Western Hemisphere. They have said that Puerto Rico's wide variation in topography and climate, and in agricultural and industrial development, offers them excellent opportunities for interesting training. ♦

URBAN POPULATION EXPLOSION

Seventy percent of the people in the United States are living on about 1 percent of the land.

If this trend is allowed to continue, 100 million more Americans will, by the year 2000, be stacked on top of the 140 million already in urban areas. ♦

A pilot program that gives a continuing conservation education to children from the first to seventh grade has been started by the Monroe County Soil and Water Conservation District in Indiana.

Student teachers from Indiana University in Bloomington and other volunteers in the district help teach the 1-hour-a-week classes.

District supervisors initiated the program, the first of its kind in Indiana, at Washington Township Consolidated School in Bloomington. The student teachers are fulfilling requirements for a degree in elementary education under Professor Prevo Whitaker of Indiana University, who is also secretary-treasurer of the district.

Professor Whitaker, Wayne Fix, SCS work unit conservationist, and the author held meetings with the Washington school principal, teachers, and others to develop plans for the course.

A custom-tailored course

The course may touch on any phase of man's relationship to his natural environment, from how the White River got polluted to how many trips in 12 hours a bird makes away from her nest hunting insects.

The conservationists assisting with the program make an effort to custom fit the subject matter to specific age groups, giving the teachers opportunity to carry conservation into many areas of study.

The fifth grade has integrated a new science program with conservation interests by experimenting in making soil. They observe what happens when leaves, sand, and fertilizers are mixed and let stand for a period.

The sixth grade has been given many class hours of instruction on land use. During one session, a conservationist discussed land capability and explained why some of the "hills and hollows" of southern Indiana are not suitable for farming.

All the classes have field trips to see actual examples of the things

Student teachers join in district program to give children the facts of conservation

By Barbara Restle

Supervisor, Monroe County Soil and Water Conservation District, Bloomington, Ind.

discussed in lectures. All 220 children were taken to their new school site in four shifts. The older children were put to digging a 2-foot-deep hole to obtain soil samples at various depths and see the differences between topsoil rich with organic matter and the deeper subsoils and parent materials. Earlier in the semester all the students had run the experiments in growing peas or corn in topsoil and subsoil and to observe the health of the plants.

All the classes also planted conifers to serve as a windbreak for the future playground. Three sink holes on the new school site were inspected, and students learned that sink holes and caves are a natural feature of limestone country.

During the spring semester Joe Lamendola, biologist of the Indiana Department of Natural Resources, spoke to a large group of students about the needs of wildlife.

Ned Woodward, Monroe Lake conservation officer, spoke about migrating birds and told how special areas in the new reservoir have been designated off limits to power boats to insure resting and breeding places for ducks.

A state forester, John Datena, led student groups into wooded areas identifying trees and explaining plant succession. The forester showed how to estimate the height and board feet of trees by using a tree-measuring stick.

The regular teaching staff at Washington School was encouraged to introduce conservation ideas into their classes in art, math, biology, geography, and history. For the first three grades, art projects proved

most meaningful in putting across concepts in conservation.

Teachers had the benefit of a wealth of educational materials from such sources as the Massachusetts Audubon Society, National Audubon Society, the Soil Conservation Society of America, Boy Scouts of America, and the Soil Conservation Service.

The Washington Township Farm Bureau donated \$75 for a conservation library, and a portable library rack was built to hold the books. The new library includes information on the precarious balance of nature, mammals and birds, geology, and water. To broaden the picture for the midwestern child, a few books deal with arctic and tropical wildlife and conservation problems.

Awareness of resources

The goal of our district is to give students an awareness of natural forces at work in the land. Hopefully, the conservation classes will encourage better citizenship by developing a deeper understanding of natural resources.

Professor Whitaker says, "We must always take advantage of new ways to use our knowledge to help deal with the growing scarcity in world resources. In our community we have had many willing citizens to help us along our way. We started with the supervisors of our district contacting school administrators and enlisting the help of qualified technical personnel and talented local citizens. During the entire semester I can't remember anyone turning down our request for assistance." ♦

The horse is still king on Nebraska ranch . . .

A rodeo family practices conservation



Signs of the old West are still visible as you travel through Mitchell Pass, the famous landmark for Oregon Trail pioneers in western Nebraska.

The Pass itself has become a part of a national monument, and within sight of it lies Lew and Doris Herstead's horse ranch. Here the horse is still king even though he isn't the main power for transportation as he was in the 1840's.

Instead of prime beef, the Hersteads produce rodeo animals—and rodeo entertainment—to meet the growing demand for recreation. The whole family takes to horseback, and three of the five children have won honors in rodeo competition.

Lou Ann, age 14, has a number of trophies. Her ambition, however, is to finish college and teach history.

Lew Herstead practices roping to train his horses as rodeo animals. Kathy is his constant companion as he irrigates pasture. In the background (right) is Mitchell Pass National Monument, marking the Oregon Trail of pioneer days.

Members of the Lew Herstead family follow visible signs of the old Oregon Trail through Mitchell Pass. Left to right are Valerie, Lou Ann, a visiting cousin, Lew, and Kathy.





Valerie, 12, stars in goat pinning. Johnny, 18 and the chief helper, specializes in horse training and in winning bulldogging prizes at rodeos in three states.

Kathy, littlest cowhand, age 4, never misses a thing as she moves about the ranch on Powderpuff, her favorite Shetland. Joe is the only exception, his early teen desire is for a motorbike.

Doris keeps the household going and patches the ripped britches. She leaves the horse training to the rest of the family but is at home in the saddle when necessary.

"We keep a few cattle to train horses with and market some beef, too," says Lew. The training goes on in their private arena in a protected canyon just under the rim where the wheel marks of the old Oregon Trail are still showing.

To keep horses takes grazing and hay and water—water for the horses and for the grazing and hay. Much

more water than Oregon Trail riders had in their wagons at this point in the journey.

A Great Plains Conservation Program contract, with technical assistance from the Scotts Bluff Soil and Water Conservation District, has helped Lew with this part of the business. Two wells with windmills keep fresh water flowing for the horses. Rondo Baca, the stud, has his own private 25-acre pasture and shares a well with other pastures.

Water for the grass comes from an irrigation district. Herstead has seeded 48 acres of an alfalfa-grass mixture on former cropland. In the process of leveling for irrigation, he actually reclaimed about 7 acres. Besides the 3 tons of hay an acre, these fields furnish spring and summer grazing for 27 horses and 20 calves plus year around forage for roping stock and 50 additional calves during fall and winter. Horses are kept on feed 12 hours a

day, mostly hay but a little grain for those working hard in the arena.

Meanwhile back on other parts of the ranch more conservation work is going on. The irrigated grazing makes it possible to defer use of 105 acres of range, saving it until fall. Strategic placing of the wells helped with this job, too. And the fencing is arranged to make best use of both range and pasture and still get to water.

This kind of organization lets the Hersteads put seven or eight trained horses a year on the market. They sell to rodeo riders, stockmen, or anyone who wants a working horse ready to go. In a few cases they have trained horse and rider together on a contract basis. Trained cow horses bring about \$200 each, and the horse-rider package gets up to \$500. They keep eight broodmares on another place to produce the foals for training.

Riders of the Oregon Trail had

no such source of trained stock in their day, but the demand then would not have been what it is today. In this age of expanding population seeking sources of recreation and entertainment, someone must work hard to train the animals that are a part of the show. The Her-

steads are doing their part.

Lew won't admit he is a rodeo performer even though he can do that job, too. "Too busy irrigating to go to the rodeo," he says. But the training the horses get, and the supervision this rodeo family gets, all stem from his "horse sense." ♦

Proving a point . . .

The great outdoors is the greatest teacher

School folks down in St. Martin Parish, La., have developed a model 9-acre outdoor education center where students take advantage of nature's handiwork to learn about ecology and resource conservation. The project is so popular that the local school board is already looking for room to expand.

Jeff DeBlanc, St. Martin Parish High School curriculum supervisor, explains it this way:

"Back in 1962, Robert Daspit and I were teaching science at St. Martinville High School. We realized a need for outdoor study. The school board owned 40 acres that was being developed for playgrounds and other school activities. Through Superintendent L. H. Boulet, we persuaded the board to leave 9 acres for outdoor nature study. About that time, the Elementary and Secondary Education Act of 1965 became law, opening up new opportunities for Federal financial help with such projects. We applied for an operational grant of funds under Title III of the act."

Call for help

DeBlanc did not wait for approval to begin work on his pet project. He turned to resource agencies for information to support the proposal and, more importantly, to get the work started. Among the first agencies contacted were the Grande Coteau Ridge Soil and Water Conservation District and the Breaux Bridge work unit of the Soil Conservation Service.

Plans to develop the outdoor classroom called for several things. First of all was a soil survey by SCS soil scientists; then a plant, forest, and wildlife survey by the Louisiana Forestry Commission, Louisiana Wild Life and Fisheries Commission, and SCS working together. The SCS people assisted in locating trails through the area, determined elevations, and designed and staked out a pond. A slough was improved for aquatic plant and animal study.

"By the time the project was approved for Title III funds in 1966, and the first grant of \$170,000 allotted, the project was well underway," DeBlanc said. "We immediately put the money to use for outside fencing, roads, buildings, scientific equipment, and labor."

Nature study area

The area is densely covered with vegetation, excellent for nature study. Dr. John Thieret of the Biology Department, University of Southwestern Louisiana, in Lafayette, has identified more than 150 species of grasses, forbs, shrubs, and trees on the area. More than 12 dozen species of animals roam the "classroom," and countless aquatic plants and animals live in the pond and other water areas.

Each of six high schools in the parish has its own plot at the classroom site to study plant, animal, soil, and water resources. Three buildings are equipped with up-to-date equipment for outdoor study in biology, physics, and earth

science. There is a closed circuit TV with cameras focused on designated spots for animal study.

The outdoor classroom is developed for three phases of study: 80 percent for biology and ecology, 10 percent for earth sciences, and 10 percent for physics. Math students use the area to solve problems involving calculations of distance, area, and volume of natural features.

Time for study

Time spent by students at the outdoor classroom is scheduled as a part of planned study. Generally 8 to 10 days are spent at the area during a 36-week course. More than 2,000 parish students use the outdoor facilities each year, plus several hundred out-of-parish students and other youth groups. One plot is set aside for local garden clubs and Boy Scouts. Another area is designated for artists. There is also a planetarium and an observation tower.

An additional grant of \$80,000 of Federal funds is due in 1968. "This money is already earmarked to develop a lagoon on nearby Bayou Teche, to buy a bus to transport students to and from schools, and perhaps to obtain a full-time teacher with a degree in biology and education," DeBlanc said.

Other plans call for putting in a walk-down trench to study soil profiles and planting a number of introduced plants for study.

DeBlanc and other parish school people see many values in their outdoor classroom. An important one is that the discovery method of teaching is generally more meaningful to all the students. Another is the stimulation for learning among students whose grades have been lagging.

"We all see a need to expand even now," DeBlanc says. "I think we are proving a point: The great outdoors is one of the greatest teachers."—S. B. GAUTHIER, *work unit conservationist, SCS, Breaux Bridge, La.* ♦

Mississippi advisory council enhances agency cooperation in conservation education

By **W. L. Heard**¹

State conservationist, SCS, Jackson, Miss.

Mississippi has traded its "scatter gun" approach to conservation education for a "concerted cooperative approach" with the formation of a State Conservation Education Advisory Council.

At the invitation of J. M. Tubb, state superintendent of education, representatives of state and Federal resource-use agencies, schools, and other groups met in Jackson in May 1967 to form a council to work with Department of Education officials on matters pertaining to conservation education.

We agreed that the council should: (1) Draft a constitution and bylaws; (2) define its purpose; and (3) establish immediate and long-range objectives.

Committees were set up to accomplish these assignments, and at a November meeting the council adopted these documents, elected permanent officers and a steering committee for 1968-69, and expressed their views about priority of objectives.

Immediate action

One of the immediate steps was to write the gubernatorial candidates and the incoming state superintendent of education, emphasizing the need for a full-time staff position in the State Department of Education with primary responsibility in the field of conservation education.

Other immediate-action objectives include expansion of summer workshops for teachers and a list of services and material available to

teachers from the resource agencies.

Many interested persons have asked us to outline the steps through which the council was formed. In our experience, two key factors stand out:

(1) It is important for any group or agency, seeking to strengthen conservation education in the schools, to realize that the state superintendent has the responsibility for the public school curriculum and education program at elementary and secondary levels.

(2) No single resource agency is in a strong position to sell "conservation education" to the State Department of Education. Educators very much prefer to consider the total resource picture.

Mississippi is fortunate to have the persistent and enthusiastic leadership of P. D. Houston, chairman of conservation education and publicity for the Mississippi Association of Soil and Water Conservation District Commissioners. This group is in an objective position; it has the prestige of lay leaders, and can coordinate the efforts of many other groups.

Groundwork

Over a period of years, Mr. Houston has developed an excellent rapport with the State Department of Education and educators.

In 1966, with responsibility for a conservation education panel at the state association meeting, Mr. Houston included the following educators: A. P. Bennett, director of the Division of Instruction, and R. C. Roberts, state science supervisor,

State Department of Education, and Peter Green, principal of Canton Elementary Schools. Also on the panel were David Kistner, Snellville, Ga., chairman of the NACD Education Committee, and Mrs. Hugh Norman, Sr., Summit, Miss., president of the Association's Ladies Auxiliary.

The panel provided an opportunity for these individuals to exchange ideas. Perhaps its most important accomplishment was psychological. Because the representatives for the State Department of Education were speaking their thoughts about conservation education, they were not just listening. They were supporting conservation.

As a result of this meeting, Mr. Houston and representatives from the SCS met with the Department of Education officials to discuss what might be done.

It was not long before the state superintendent of education agreed to take the lead in calling a meeting for the purpose of organizing a council, and we in the Soil Conservation Service were happy to provide some help with planning the initial meeting and suggesting some people to be invited.

We believe the council will provide the concerted cooperative approach to solve conservation education problems. ♦

Soils information used

Soils information guided the building committee of Shady Grove Baptist Church in Rapides Parish, La., in replacing the building that burned in December 1966.

Information provided by the Soil Conservation Service confirmed that the building site was suitable and was used by the architect in determining the foundation needs and designing the building.

The chairman of the building committee, James Melder, requested the assistance after seeing a television program on use of soil surveys.—JACKIE L. SMITH, *soil scientist, SCS, Alexandria, La.* ♦

¹ Mr. Heard is chairman of the Mississippi State Conservation Education Advisory Council.



Mr. and Mrs. Rufus Simmons are proud of their new house (above) built in 1964 to replace their former quarters (below). The old barn was replaced in 1966.

From cow, sow, and hen to a modern mechanized farm

Assistance from USDA agencies helped Rufus Simmons of Henderson County, Tenn., convert his small subsistence farm into a modern agricultural enterprise in a period of 10 years.

In 1957 the Simmons were struggling to rear a large family of six children and eke out a meager living on 87 acres of eroded hill land. Their resources consisted of two work horses, a milk cow, and one brood sow. The family of eight existed in a two-room shack.

Simmons had a 13-acre cotton base and had been trying to grow it on hill land. In 1957 he produced only six bales of cotton on the 13 acres and 180 bushels of corn on 12 acres.

He applied for ACP cost-share assistance on construction of a farm pond in 1957. The Soil Conservation Service technician made his initial visit to help in selecting a pond site. During this first visit he explained other services available from SCS, Farmers Home Administration, and other agricultural agencies.



Mr. Simmons was immediately interested and soon developed a soil and water conservation plan for his farm as a cooperator with the Henderson Soil Conservation District.

He began to apply conservation practices as rapidly as possible. The technician was contacted regularly for information and guidance. In 1964 Simmons was assisted by Farmers Home Administration in purchasing an adjoining farm. The FHA loan provided for a new home, barn, tool shed, machinery, and the application of planned conservation practices.

Simmons has constructed 2,000 feet of open drains, 1,100 feet of diversions, and reclaimed 27 acres of

wet bottom land, is using improved crop varieties, applying fertilizer according to needs shown by soil tests, growing cover crops, and is improving pastures and hayland.

The additional land bought raised the cotton base from 13 acres to 22 acres, and in 1965 he produced 38 bales of lint cotton on 22 acres. Fifteen acres of corn produced 80 bushels an acre the same year.

The Simmons now live in a new home with modern conveniences. He has constructed a new barn and tool shed and owns a tractor and a one-row cotton picker. Everyone works at the Simmons' place and they are prospering.—AARON C. PETERS, *work unit conservationist, SCS, Lexington, Tenn.* ♦

Soil workshop helps Michigan sanitarians prevent public health hazards

On January 1, 1968, Michigan's county sanitarians reached for their soil augers and newly published soil surveys and headed back to school, for Michigan's subdivi-

sion control act had just become law.

The act gives county sanitarians the responsibility for determining the suitability of soils for new subdivisions not serviced by public sewers. It's a responsibility for which many of the sanitarians had no background.

To provide this background, the Michigan Department of Public Health asked the Soil Conservation Service to plan and conduct a 2-day workshop in soils and soil surveys. Three soil scientists (the authors) taught the short course, assisted by Merlin Damon, sanitarian from Macomb County.

Although the 82 sanitarians at the workshop did not become soil experts during the 13 hours of instruction, they did learn about many phases of the soil survey and how they could learn more. Part of the workshop consisted of lab and field exercises in determining soil texture and recognizing natural drainage.

The sanitarians also previewed a new soil judging card which lists the major items affecting the suitability of soils for septic tank filter fields.

Prior to the passage of the act, most sanitarians relied mainly on percolation rates to determine the suitability of soil for building sites. The soil scientists explained that when used alone these tests could be misleading. Soil maps outline areas with fluctuating high water tables where percolation tests can give false impressions. The maps also enable the sanitarians to assess sites during the winter when percolation tests cannot be conducted.

Each sanitarian received a 60-page *Soil Manual for Sanitarians* which had been prepared specifically for the workshop. The manual, containing the same material discussed at the workshop, will serve as a reference for future work.

The reaction to the workshop wasn't long in coming. Several weeks later a soil scientist was asked by a sanitarian to conduct a similar workshop for 20 professional people in his county. Additional workshops have been conducted or are planned for 1968.—BRUCE WATSON, JOHN LONG, AND NEIL STROESENREUTHER, *soil scientists, SCS, Burlington, Vt., and Alma and Harrison, Mich.* ♦

Sanitarians were able to see and feel the difference between soils during the session on soil texture.



USDA-INDUSTRY FORCE TO STUDY EUTROPHICATION

A joint industry-government task force consisting of USDA and representatives of agricultural industries has been established to investigate the control of eutrophication of lakes. Eutrophication results from excessive fertilization of algae and other aquatic plants in impounded waters by nutrients in pollutants—principally nitrates and phosphates—in municipal sewage, human waste, agricultural fertilizers, detergents, and industrial discharges. ♦

Reservoirs used to tap Rio Grande during peak flow

The Rio Grande River, a geographic boundary for the United States and Mexico, is also a great source of water for crops in the Rio Grande Valley—that is, when the water is up.

Because of seasonal variation in flow, however, there are times when pumping of irrigation water is strictly limited. Then there are times when the water is “free” for pumping without restriction.

To have water when needed by crops, Clarence L. Morris, president of La Casita Farms, Inc., near Rio Grande City, Tex., built, using the farm's own equipment and manpower, the first private reservoirs for farming operations in the Rio Grande Valley. The three reservoirs give La Casita storage capacity of 337 acre-feet of water. The company complied with all water laws and obtained the necessary clearance to use the water from the river.

Morris worked out plans for the reservoirs and pipelines with technical help from the Soil Conservation Service office serving the Starr County Soil and Water Conservation District. Ray Rochester, manager of La Casita Farms, and his brother Jim, ranch foreman, were valuable aids in planning and constructing the system.

“I'd thought about this project for 3 or 4 years,” Morris recalls. “I hadn't dreamed I would see this come true.”

But come true it did, and with the completion of the project, 750 acres of higher ground were converted from grazing land to vegetable and melon fields, adding their production to the 1,800 acres lying along the river and irrigated by a previously installed system.

The pumping system

The reservoirs at La Casita are supplied by a pumping station at the river with a capacity of 8,000 gallons per minute through 18,000 feet of 18-inch asbestos-cement irri-



An 18-inch asbestos-cement irrigation pipe goes into place at La Casita Farms near Rio Grande City. The same pipe carrying water to reservoirs on high ground when the Rio Grande River is up will return it for distribution later.

gation pipe. Additional water is pumped from four wells. Six more wells could be coupled to the pipeline in the future, and all 10 wells would provide 4,500 gallons per minute for the reservoirs.

Morris noted that the well water contains more chloride salts than the river water so water from the two sources is blended in the reservoirs.

A pump beside the main 200-acre-foot reservoir lifts water through 12,500 feet of 16-inch irrigation pipe to a 62-acre-foot reservoir.

A 24-inch, gravity-flow pipeline equalizes the level of this reservoir with a third having a 75-acre-foot capacity.

From the third reservoir, irrigation water is distributed through 6,000 feet of 12-inch pipe to serve 250 acres of new cropland. This system has a capacity to irrigate 500 more acres.

Pipelines that carry the water to reservoirs can also distribute water back to the fields for irrigation. The distribution is by gravity flow and is regulated by gate valves at stra-

tegic locations along the pipelines.

Depending on the crop, irrigation is by flooding or sprinklers.

Conservation cropping

The major crops grown are lettuce, honeydew melons and cantaloupes, cauliflower, cotton, potatoes, and celery.

La Casita averages 1½ crop acres per year per acre of ground with a double crop every 3 years.

Crop rotation is followed with a different crop grown on each acre of land each year, and to this is added a precise schedule of fertilization and cover crops.

With the assistance of Ray and Jim Rochester, Morris also has directed the leveling and reworking of the land on La Casita Farms and replating the fields. This has resulted in more uniform irrigation and more efficient use of machinery on the row crops. Pioneering with a reservoir system which stores valuable Rio Grande water at times of high seasonal flow and wise use of its resources are marks of La Casita Farms, Inc., and its management. ♦

Nurserymen association emphasizes retail selling

The annual meeting of the American Association of Nurserymen, Inc., takes place in St. Louis, Mo., on July 13-17, and "Meet Me in St. Louis" is the association's theme. Emphasis this year is on retail selling.

The keynote address on that subject will be delivered by Ben Wells, president of 7-Up.

Dates and places

July 7-9, Association of American Agricultural College Editors, Knoxville, Tenn.

July 13-17, American Association of Nurserymen, St. Louis, Mo.

21-25, Business and Professional Women's Club, Minneapolis, Minn.

28-31, National Association of County Government Officials, Washington, D. C. August

1-2, Great Plains Agricultural Council, Denver, Colo.

5-10, Third North American Forest Soils Conference, Raleigh, N. C.

18-21, Soil Conservation Society of America, Athens, Ga.

18-22, The Conservation Education Association, Colorado Springs, Colo. ♦

District supervisor spreads soil stewardship message

Over the past 6 years Central Aroostook Soil and Water Conservation District Supervisor Charles Knight of Limestone has preached nearly a score of Soil Stewardship Sunday sermons to churches in seven different communities in Aroostook County, Maine.

Besides being a leader in his church, Knight serves as chairman of the Maine Soil and Water Conservation State Committee. During his tenure as a district supervisor, he has helped start four watershed projects, and his district joined two others to form Maine's first RC&D Project.—JOHN MALLEY, soil conservationist, SCS, Presque Isle, Maine. ♦

Youth assistants help district supervisors

To give young people a leading role in conservation, the Catawba Soil and Water Conservation District initiated the Youth Assistant District Supervisor Program, the first in South Carolina.

About a year ago the district board of supervisors appointed five "youth assistants." Chosen for their leadership potential by vocational agriculture teachers in the five York County high schools, these students deal with both youth and adult groups in promoting conservation. Members of the first youth assistant board are Arthur Black, chairman; Mike Stokes, vice-chairman; and Bud Johnston, John Buchanan, and Tommy Robbins.

The youths handled the Annual State Bankers-Soil and Water Conservation District essay contest. They carried conservation literature to elementary schools, collected the essays, and presented the awards. More than 600 essays were written by fifth, sixth, and seventh grade students in the district.

To promote soil stewardship, the young supervisors helped plan a conservation tour for ministers and took over the sections on flood damage and sedimentation. They carried soil stewardship handbills to all the supermarkets in the district.

Vocational agriculture teachers like the youth supervisor program.

"It's good to involve the thinking of young people in the adult decisions made in soil and water conservation," says Floyd Johnson, agriculture teacher at York High and also president of the American Vocational Association.

One of Johnson's programs for fourth year agriculture students is to have each one teach a class on some phase of agriculture. Arthur Black taught the activities of soil and water conservation district supervisors to his fellow agriculture students. Black says he's learned there's more to soil and water con-

servation than building ponds since he has been an assistant supervisor.

Carl Mauney, agriculture teacher at Clover High, likes the contribution this program makes to citizenship. His student, Mike Stokes, has brought a new awareness of conservation to the classroom since he started serving as an assistant supervisor. He introduced a soil stewardship program in the school this year for the first time.

The idea for youth supervisors got going with W. B. Wilkerson, Jr., chairman of the Catawba District. Wilkerson discussed it with John R. Parris, associate executive secretary of the State Soil and Water Conservation Commission, and with the SCS work unit conservationist.

The program was included on the agenda of the 1967 meeting of supervisors, and other districts are now copying the model set. ♦

County government busy in conservation work

Most county governments in California are actively participating in soil and water conservation programs and making use of the services of the Soil Conservation Service and soil conservation districts, a recent county-by-county survey of SCS activities with county boards of supervisors and their planning commissions showed.

All county planning commissions in counties with land affected by the Williamson Conservation Act regulating the zoning of prime agricultural land have formally or informally contacted the SCS for land-capability interpretations. Many county assessors have also been given interpretations of land-capability classifications.

The survey also disclosed that in 37 counties the boards of supervisors are assisting in the program of flood prevention, mainly through the Watershed Protection and Flood Prevention Act.

Some 12 county boards of supervisors have contributed money toward regular or special soil surveys in their counties. These firm pledges amount to more than \$75,000. Other counties are formulating proposals for allocating additional funds towards soil surveys which may amount to about \$165,000.

Four counties have invited proposals for Resource Conservation and Development projects, and the county supervisors have held public meetings.

Seven SCS conservationists have been appointed by the boards of supervisors to serve on special committees or in advisory capacities to planning commissions.

Direct assistance to several counties has been provided through soil conservation districts by supplying technical information for developing studies or ordinances on conservation and protection of natural resources.

Soils information for use in zoning, parks, subdivisions, disposal areas, drainage, recreation sites, or gravel pit reclamation and the like has been in demand, and nearly every SCS office in the State has furnished this information to county boards of supervisors through the local soil conservation districts.

Finally, the Soil Conservation Service is frequently called on by county officials to supply technical data and assistance for many types of programs. This help has included reporting on acreages of class I and II land in the county; training county assessor's staff on the use of detailed soil maps; developing ordinances for reseeding cuts and fills; preparing conservation plans for outdoor conservation school laboratories and for such county lands as parks, prison farms, and rights-of-way; solving mosquito abatement problems connected with irrigation, tailwater returns, and drainage; relocating roads; planning watershed management; reducing siltation; controlling brushland and wind erosion; and reseeding burns. ♦

Soils study helps solve Guatemala's food and unemployment problems

A soils study made by Rafael A. Boccheciamp, a bilingual soil scientist, Soil Conservation Service, may help substantially to solve some of Guatemala's food production and unemployment problems.

Guatemala's 4.2 million people make it the most populous of the five Central American Republics, and it is growing at the rate of 3.1 percent a year.

The Guatemalan Government hopes to reduce the number of unemployed from overcrowded highland cities near the Pacific Coast by building roads into the northern regions of the country.

At the same time, the Government's National Transformation Institute is making plans to boost agricultural production into these regions and to resettle subsistence farmers on land suited for farming.

But several basic questions that face land developers in any country have to be answered first.

Which soils are best suited for what use? What types of land treatment are needed and how can they be applied?

The local Agency for International Development Mission, called

in to study the situation, gave top priority to a soils and drainage study for the Department of Izabal and asked USDA for help. Boccheciamp, an SCS soil scientist in Puerto Rico, volunteered for the job and set out under a 6-month agreement to classify and test soils on about 500,000 acres in northeast Izabel.

He arrived in June 1967 and became impressed by the industry of the Guatemalans appointed to work with him. They would rise as early as 4:00 or 5:00 a.m. to walk from their homes to the truck that carried them into the bush for soils investigations.

His counterpart soil scientists, all graduates of the University of Guatemala, helped by digging pits for soil profiles, identifying soils, and whatever they could do to help.

Boccheciamp found that between 60 and 70 percent of the area was covered with forest. Much of this grew on steep slopes with a thin layer of soil covering limestone or other bedrock.

On these slopes, farmers would cut and burn the forest to clear a patch for planting corn. Without

SCS Soil Scientist R. A. Boccheciamp describes a Galvez soil profile.



fertilizer and lime the corn seldom grew beyond 12 to 18 inches high, and ears were only a few inches long.

The main diet was tortillas and corn. Some farmers gathered edible plants from the forest, but they were hardly substantial.

Boccheciamp saw these farmers' level of subsistence and grew increasingly concerned about their welfare. When he visited their thatched huts and small villages, they welcomed him. By agreement, his job was to advise the Guatemalan Government; and as he worked, he added the desire to help the Guatemalan people directly.

He tried to tell them that soil washed freely from the hillsides when the forest was cut and burned. But few understood. They felt they only had to cut more forest to find new land. Downstream flooding wasn't their problem.

The major problem in the lowlands was drainage. Streams that ran from the highlands on one side to the Motagua River on the other caused frequent flooding during the rainy season. The water table—generally high—fluctuated greatly. Many lowland areas had complex drainage problems.

Boccheciamp concluded that underground water movements would have to be mapped, and expensive engineering works would be required to put such land into crops.

Altogether, he identified 30 different kinds of soil, gave recommendations for their use, and made a map to indicate, from field examinations and soil samples, which areas were suitable for cultivation and what chemicals were needed.

He recommended crops for the soil types, emphasizing high protein crops to put more of this much-needed nutrient into the local diet.

Boccheciamp translated his report into Spanish and returned to Puerto Rico.

A valuable guide for land use planning in northeast Izabel is now available to a Government struggling to apply it. ♦

Review



Cattle on a Thousand Hills. BY DANA CLOSE JENNINGS. 1968. *North Plains Press, Aberdeen, S. Dak.* 90 pp., illus. \$5.50.

Cattle on a Thousand Hills is the factual story of a third-generation South Dakota ranching family, the Suttons—three brothers and their families who manage five ranches extending some 35 miles along the east side of Oahe Reservoir. The brothers specialize in purebred Hereford bulls of the rugged range type, and quarter-horses, but they also run 850-plus commercial cows, a championship rodeo herd, and the oldest private buffalo herd in the world.

The book includes some history of the first Sutton family ranch (part of which was flooded for the Oahe Dam Project), but is mainly an interesting "how-to" and "why" account of up-to-date ranching methods. Most of their land is in the Great Plains Conservation Program, and they follow such practices as pasture rotation, fertilizing, chemical weed control, cross fencing, and the use of windbreaks and artesian wells. Linebreeding and progeny testing have proved successful, and irrigation is "getting a whale of a try."

The Sutton brothers have won a number of awards as recognized leaders in range management and good land use. But conservation ranching earns more tangible rewards as well. "When we had 28,000 acres on the home ranch, we only ran 800 to 900 cows on the whole spread," they say. "Now, on the three (cattle) ranches together, we're running 1,300 to 1,400 head on 7,000 acres less land."

Cattle on a Thousand Hills describes such ranch-life occasions as roundup and rodeo time and stock sale days. A detailed "ranch terminology" explains many terms likely

to confuse readers east of the Missouri. The 90 pages are profusely illustrated.

The book is a happy combination of warmth and authenticity. It can be read for pleasure by the suburbanite with a quarter-acre of crabgrass and for profit by a working rancher.—C. JOHNSTON, *Information Division, SCS, Washington, D. C.*

New publications

Restoring Surface-Mined Land. BY THE U. S. DEPARTMENT OF AGRICULTURE. 1968. *USDA Misc. Publ. 1082.* 18 pp., illus. \$0.15. The six types of surface mining—open pit, area stripping, contour stripping, auger mining, dredging, and hydraulic mining—lay bare, rearrange into parallel ridges, or scoop out the land like a soup-bowl. Properly treated and managed, the land can be returned to safe and productive use, even become a greater asset to the community than it was before mining. Left alone, it may produce only stream-fouling sediment and acid. Much has been done by Government, industry, and land owners and operators in restoring this land. The bulletin points out that during one 5-year period, 1960-64, more than 5,000 land owners and operators in 500 local soil and water conservation districts in 31 States applied conservation measures to nearly 128,000 acres of surface-mined land with USDA help.

Making Rural and Urban Land Use Decisions. 1968. *Soil Conservation Society of America, Ankeny, Iowa.* 40 pp., illus. \$0.75. An attractive two-color booklet adds a popular treatment of general land-resource problems to the Society's complement of conservation publications.

The booklet reviews available land resources and current demands in the United States. It discusses planning, both short-term and long-term, and suggests steps for initiating sound land use planning within a community.

The booklet is intended for use by citizen groups as well as state, county, and local governmental units concerned with land use. It is available in quantity at reduced prices.

Credit for preparing the booklet is given to members of the Special Publications Committee: Frank M. Shaller, Iowa State University; D. Harper Simms, Soil Conservation Service; and Ruth L. Hine, Wisconsin Department of Natural Resources.

Grasses and Legumes for Soil Conservation in the Pacific Northwest and Great Basin States. BY A. L. HAFENRICHTER, JOHN L. SCHWENDIMAN, HAROLD L. HARRIS, ROBERT S. MACLAUCHLAN, AND HAROLD W. MILLER.

1968. *USDA Agr. Hbk.* 339. 69 pp., illus. Summarizes 32 years of testing grasses and legumes for conservation uses in five plant materials centers of the Soil Conservation Service and cooperating state agricultural experiment stations.

The results of intensive work on adaptation, cultural requirements, and management methods are reported for 134 species and varieties under 10 conservation-use groups: (1) Rapid-developing short-lived, and (2) long-lived, grasses for subhumid and irrigated areas; (3) saline- and alkali-tolerant grasses; (4) drought-tolerant long-lived bunch, and (5) sod, grasses; (6) the bluegrasses; (7) fine-leaved grasses for cover, erosion control, watershed structures, and recreation areas; (8) wet meadowland grasses; (9) grasses for dunes and sandy land; and (10) legumes.

The principal species described are illustrated with excellent original line drawings by Lucretia B. Hamilton, wife of the former manager of the Tucson, Ariz., Plant Materials Center. Colored agricultural zone maps help indicate the range of adaptation of each kind of plant.

Wind Erosion Forces in the United States and Their Use in Predicting Soil Loss. BY E. L. SKIDMORE AND N. P. WOODRUFF. 1968. *USDA Agr. Hbk.* 346. 42 pp., illus. \$0.25. Detailed information on wind-erosion forces for locations throughout the United States for use in assessing erodibility of field soils and in designing control practices to combat the ravages of wind erosion. The data presented include (1) relative magnitude of wind-erosion forces or the capacity of the wind to cause erosion on unprotected soils, (2) prevailing wind-erosion direction, and (3) preponderance of wind-erosion forces in the prevailing direction. These factors indicate, respectively, potential need for wind-erosion protection, proper orientation of erosion-control measures, and relative merits of proper orientation of control methods. Data are presented by months for 122 locations.

The report is highly technical but the results are shown graphically. Included is a chart for determining potential soil loss from the data presented.

Undergraduate Education in Renewable Natural Resources; An Assessment. BY PANEL ON NATURAL RESOURCE SCIENCE, NATIONAL RESEARCH COUNCIL. 1967. *National Academy of Sciences, Washington, D. C. Publ.* 1537. 28 pp. \$2.00. The panel evaluates trends in natural resource use that affect educational needs, identifies current curricular problems, and recommends a basic 4-year curriculum of "basic core" courses, specialized courses in four areas of emphasis, professional courses, and electives.

Clean Water—It's Up to You. (1968). *Izaak Walton League of America, 1326 Waukegan Road, Glenview, Ill.* 60025. 48 pp., pocket size. Prepared by the League's "Citizen Workshops for Clean Water for America" project. Free copies available from the League.

Soil and Water Research on a Claypan Soil. BY V. C. JAMISON, D. D. SMITH, AND J. F. THORNTON. 1968. *USDA Tech. Bull.* 1379. 111 pp., illus. \$0.35. Results of research conducted at the Midwest Claypan Experiment Farm, McCredie, Mo., 1937-62, by the Agricultural Research Service in cooperation with the Missouri Agricultural Experiment Station.

Federal Assistance in Outdoor Recreation. Rev. 1968. *U. S. Dept. Int., Bureau of Outdoor Recreation, Publ.* 1. 99 pp. \$0.35. An exhaustive listing, by departments and agencies, and brief descriptions of the services and assistances available to states, their subdivisions, organizations, and individuals.

Vertical Coordination Via Contract Farming. BY MARSHALL HARRIS AND DEAN T. MASSEY. 1968. *USDA Misc. Publ.* 1073. 101 pp. \$0.65. Furnishes needed insight into the legal-economic nature of farming under vertical coordination contracts and the overall legal-institutional milieu in which such contracts are negotiated and performed.

Private Assistance in Outdoor Recreation. BY U. S. BUREAU OF OUTDOOR RECREATION. (1968). *U. S. Dept. of Int.* 68 pp. \$0.30. A directory of organizations providing aid to individuals and public groups, with a list of available publications from each.

Conservation Highlights 1967. BY SOIL CONSERVATION SERVICE. 1968. *USDA un-numbered leaflet*, 6 pp. Digest of the SCS progress report for fiscal year 1967 made available in handy form for insertion in correspondence and similar uses.

The Demand and Price Situation for Forest Products. 1967. BY DWIGHT HAIR AND ALICE H. UPRICH. 1967. *USDA Misc. Publ.* 1066. 72 pp.

Soil surveys

Spokane County, Washington. BY NORMAN C. DONALDSON AND LAURENCE D. GIESE. 1968. 143 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by Norman C. Donaldson, Laurence D. Giese, Charles W. Nichols, Jack L. Wood, Clyde C. Bowlsby, and Frank B. Taylor.

Spartanburg County, South Carolina. BY WALLACE J. CAMP. 1968. 80 pp., illus.; maps 3.17 inches to the mile (1:20,000). Soils surveyed by V. A. Rogers, E. C. Herren, and Wallace J. Camp.

Barbour County, West Virginia. BY WOODROW W. BEVERAGE, WALTER J. STEPUTIS, AND WILLIAM F. HATFIELD. 1968. 65 pp., illus.; maps 4 inches to the mile (1:15,840).

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Opportunities in Conservation Education



Basic to continued social, economic, and personal development in all areas of human endeavor is recognition and acceptance by each citizen of his responsibility for rational use and proper care of the entire natural physical environment.

Personal commitment for intelligent use and management of natural resources depends on an appreciation of man's interdependence with his environment and understanding of realistic principles of natural resource use. Such appreciation and understanding can best be developed in children and youth.

Since its inception, the Soil Conservation Service has actively supported and assisted with conservation education efforts on a broad scale. As we witness the continuing movement from farm to city with the resulting disassociation of people from the land, we are impressed with the need for greater emphasis on conservation education in the classroom.

Fortunately, conservation education is coming to be recognized in its proper perspective by teachers and administrators. After 2 years of study, a special commission of the American Association of School Administrators recently identified "to make intelligent use of natural resources" as one of nine "imperatives in education."

The National Conservation Education Association phrases its policy: "We believe that a major goal of education is the recognition by man of his interdependence with his environment and with life everywhere, and the development of a culture which maintains that

relationship through policies and practices necessary to secure the future of an environment fit for life and fit for living."

SCS heartily applauds the conservation education efforts of these and other national groups of educators.

Conservation principles underlying intelligent use and management of resources and the technological skills needed to protect those resources have their roots in science. But instruction about conservation must go beyond science classes to become part and parcel of the entire educational process that prepares a student to take his place as a responsible citizen of his community, state, and Nation.

Conservation is as much a problem of people as of resources; the subject needs to be incorporated into the entire social sciences curriculum.

Art, music, and literature all are related to man's appreciation of the natural world, its infinite variety and basic unity. Teachers in every subject matter area have found that they can strengthen the content of their courses by relating them to resources and conservation.

A most effective way of helping children learn about natural resource conservation, especially in densely populated regions, is by using the school site as an outdoor learning laboratory in all areas of instruction. Outdoor classrooms are being developed throughout the country, as places where conservation can be a real part of the learning environment. SCS representatives in every community should seek opportunities to provide technical and consultive assistance in

developing these areas to make best use of soil, water, and plant resources as instructional tools that serve a practical conservation purpose.

Ideally, planning for the outdoor classroom should begin during the selection of the school site, for which SCS can provide needed soils information.

It is heartening to note the organization and development in several states of conservation education advisory councils through which much can be done to develop sound conservation education programs. In addition to the important state councils, the efforts in some areas to develop county or school-system councils merit our full support.

Nearly 300 conservation education workshops for teachers are held each summer, and colleges and universities are giving increasing attention to instruction in conservation for teachers. Yet, the prime need today is for means for teachers to acquire the knowledge about natural resources and conservation that they must have if they are to provide meaningful conservation learning experiences for children. Our efforts in conservation education are multiplied many times over when, as trained conservationists, we help teachers learn about conservation.

The task of teaching conservation is the responsibility of the teacher, just as farming is the business of the farmer. And, similarly, it is the responsibility of the professional conservationist to provide aid to conservation educators just as it is to provide technical help to land users.

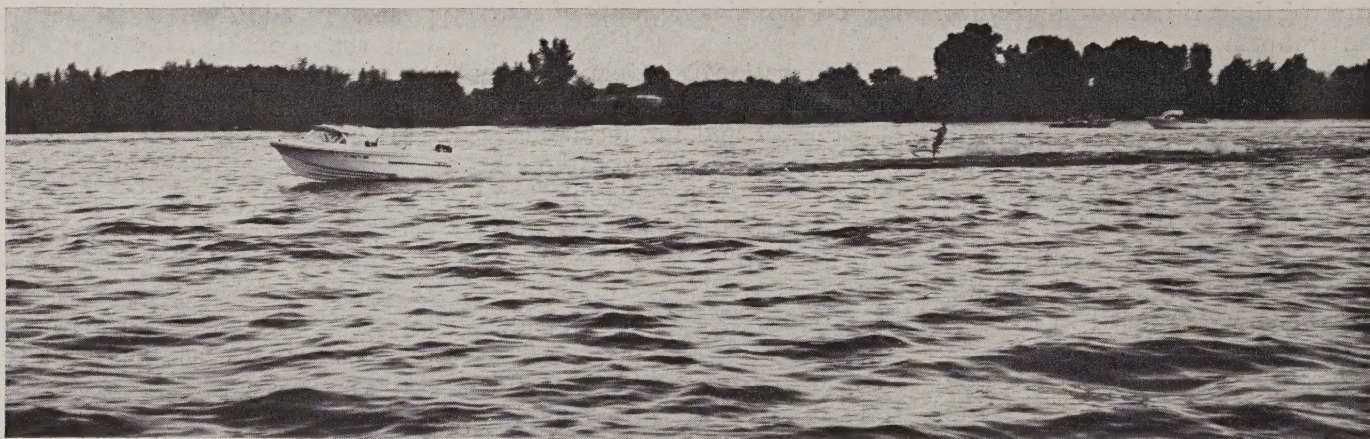
The Soil Conservation Service holds conservation education to be of highest importance, for only a conservation minded people can and will commit themselves to intelligent use, development, restoration, and preservation of our heritage of renewable natural resources.

D. A. WILLIAMS



If your address changes, please notify us of your complete new address, including Zip Code number, and include old address with our code number as shown above.

Gravel removal makes way for a beautiful lake and grove



Highway Lake was originally a gravel pit in a bend in the river.

Highway Lake and Jensen Grove, part of a golf course and municipal airport complex, will soon be adding substantially to better rural living in America by providing more recreation facilities to the people of Blackfoot, Idaho.

Highway lake is the result of the Blackfoot City fathers' foresight when Interstate 15 was constructed west of the city. The construction of the highway made it necessary to straighten Snake River. A large bend in the river next to the city was going to be abandoned by construction of a new river channel parallel to the highway. The Blackfoot City Council worked with the State Highway Department and the contractor to take the gravel from this old river channel to build the highway.

This planning and cooperation left the area between Blackfoot and the highway with a beautiful lake

for recreation—boating, water skiing, swimming, and picnicking—instead of an ugly, abandoned gravel pit to grow weeds and accumulate trash.

Headgates were installed in the river bank and pipelines placed under the highway to deliver water to the lake.

Plans are to develop the natural wooded area near the lake into a picnic area; maintain the native trees, shrubs, and grass in the grove to give outdoor atmosphere; and install a sprinkler irrigation system to irrigate the plants and make them healthier to withstand the heavy use of the recreation area. Only thistles, burrs, and dead trees will be removed.

The Soil Conservation Service provided technical information on soil, water, and plants to the city planner and Engineering Department. This recreation development

fits into the Central Bingham Soil Conservation District's broader program of providing assistance to get conservation on all the land.

Civic clubs, the chamber of commerce, private businesses, and individuals all contributed funds and labor to make their recreation area a reality. Bingham County Road Department and the Blackfoot City Street Department plan to use trucks and other heavy equipment to build the recreation complex.

Tourists are quick to comment about the beautiful approach to the city as they visit with residents of the area.

This community development of Highway Lake and Jensen Grove is bringing the people of the area closer together for better understanding of problems and of each other.—D. BOYD ARCHIBALD, *work unit conservationist, SCS, Blackfoot, Idaho.* ♦